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An Address
ON
THE SURGERY OF THE BILIARY TRACT*

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DURING the past decade great advances have been made in our knowledge of the biliary tract. The output of work on the subject is enormous and throughout it all there is abundant evidence that gall-tract disease is responsible for a vast amount of disability and suffering.

To-day, biliary surgery is more than ever concerned with cholelithiasis and its complications. It is very plain that cholelithiasis has a steadily increasing rate of incidence which cannot be entirely explained away on the grounds of earlier, or better, diagnosis. On the much-debated question of its etiology I shall say little, for it has become very complex and lies more within the province of the biochemist than the surgeon. It would seem, however, that there are but two classes of gallstones, the cholesterin-rich stones and the pigment stones, and that both are due to metabolic errors. Biliary stasis and infection of the gall bladder are not essential, though both are usually present. The cholesterin-rich stones (solitary cholesterin stones, multiple mulberry stones and ordinary gallstones) appear to arise from some error in the metabolism of fat and perhaps of calcium as well, the main factors behind the high incidence in females being obesity and multiparity. The less common pigment stones are caused by some disturbance in the metabolism of hæmoglobin. They probably form in the smaller intrahepatic ducts, whence they are transported, as fine particles in the bile, to the gall bladder.

The symptoms of biliary tract disease are manifold, protean, and not infrequently obscure. In the early stages, at least, symptoms are often referred away from the biliary tract. Between the gall bladder and the stomach the reflex is remarkably close and gastric disturbance, manifested by flatulent dyspepsia, nausea, and vomiting, is generally considered to be the most frequent symptom of cholecystic disease. Furthermore, it is common knowledge that symptoms are by no means always proportionate to the degree of pathological change. The minor grades may produce more severe symptoms than the advanced. One person may harbour gallstones for years without suffering the least distress while, in another, a mild non-calculous cholecystitis gives rise to acute pain and severe constitutional disturbance.

In most cases of disease of the biliary tract where good results can be expected from surgical treatment, a correct diagnosis can be made on the history and physical examination, but in the early stages, and these are the most important, the clinical picture is often far from clear. The pitfalls are many, and it is only by a process of exclusion that the underlying cause can be determined. Among other things, one must not forget that persistent discomfort in the gall bladder area may result from spastic

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constipation, that a tender right costal margin may be the first sign of a failing heart, and that dramatically sudden and acute symptoms, suggestive of a catastrophe in the upper abdomen, may be due to coronary occlusion. Cases characterized by vague pain and gastric disturbance can be very difficult to diagnose, and it is in this class that most errors occur. When the importance of dyspepsia as a feature in cholecystic disease became generally known, too many cases of atypical dyspepsia were attributed to gall bladder trouble and were needlessly submitted to operation. We are not entirely free from this to-day.

It was just in this type of case that one hoped that cholecystography would be of great service, but, as things are at present, it is but seldom that a diagnosis can be based on cholecystographic evidence in preference to clinical signs. Now and again the test scores, particularly by showing up stones, poor in calcium, that otherwise would have escaped detection, but in the finer degrees of cholecystic disease it is of little value and may even be misleading. As one employs more controls, it is evident that abnormal responses, even to "total absence of shadow," may occur after intravenous injection of the dye in cases where the liver and biliary passages appear to be perfectly normal.

If the full benefit is to be obtained from radiology in the elucidation of the difficult case, the examination should be thorough. Preliminary direct radiography, or even screening, may show that the source of the symptoms lies in quite a different quarter. Furthermore, in from 20 to 30 per cent of gallstone cases, direct radiography will show up the calculi so that cholecystography is not required. Radiography of an opaque meal is often advisable, especially when the cholecystographic evidence is negative, in order to eliminate gastric and duodenal lesions, visceroptosis, and the like. It should be employed more frequently in cases of unexplained jaundice, to negative malignant disease of the alimentary tract as the initial cause of the icterus.

If the patient is jaundiced when first seen, diagnosis may be far from easy. At the best of times, the differential diagnosis of jaundice is difficult, and it can be a most searching test of clinical acumen. The causes of jaundice are legion but, when confronted by a case, the practitioner's main concern is whether it is one of surgical or non-surgical jaundice, and often he has to make up his mind quickly. In the differential diagnosis of jaundice, the presence or absence of pain is of great significance. Really painful jaundice is nearly always due to stone, while painless jaundice very seldom is. Pain, apart from ache or discomfort, is typically absent in hæmolytic jaundice, intrahepatic jaundice and in obstructive jaundice due to pressure on the main bile duct from without.

When circumstances permit, various laboratory tests can be carried out but, though considerable help is often obtained by their employment, there are few tests that are not prone to error. For example, in obstructive jaundice due to stone, the proportion of split fats in the fæces usually exceeds that of the unsplit, while in cancer of the head of the pancreas the reverse is the case. Though the rule may hold in nine cases out of ten, it may fail in the very case where it is of importance. There are odd cases of cancer of the pancreas where the common bile duct is more obstructed than the pancreatic duct. It would be of the greatest service if we had a means of determining the size of the gall bladder in obstructive jaundice, for the law of Courvoisier is based on post-mortem rather than on clinical findings. We know from experience that the gall bladder can be grossly enlarged without being palpable. Cholecystography is contra-indicated in obstructive jaundice, but sometimes the pent-up bile in the gall bladder may be sufficiently inspissated to show the size of the viscus on a direct radiogram.

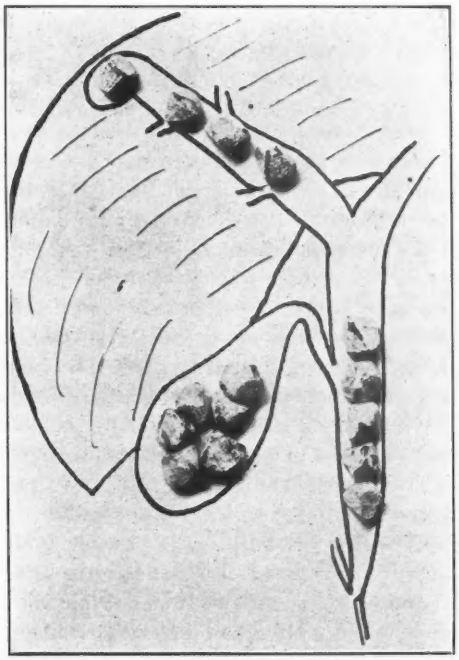
In the great majority of cases of galltract disease, the indications for surgical treatment are clearly defined and, unless there is some strong contra-indication, such as advanced age or grave intercurrent disease, the sooner operation is performed the better. Early operation eliminates most of the complications which increase the severity of surgical procedures and heighten a mortality which is otherwise insignificant. It is well to remember, however, that biliary surgery is not easy surgery. Before the novice attempts it, he should serve a long apprenticeship under a good master, so that when he finds himself confronted by operative difficulties, and very

often these occur when least expected, he may know how to deal with the situation.

If the final analysis of the end results of biliary surgery is based, as it should be, on the amount of relief obtained by the patient, it can be said in all sincerity that there are few branches of abdominal surgery where the results are so gratifying. The greatest benefit is undoubtedly obtained in cases of cholelithiasis. The gallstone may be but an incident in a more generalized condition, but it does affect the symptoms, course of the disease, and the prospect of cure. In the non-calculous cases, the end results are not so good, particularly in those cases where the pathological changes were but slight and the symptoms complained of were vague pain and digestive disturbance. There is still a difference of opinion regarding the treatment of acute cholecystitis. It is argued, not without reason, that acute cholecystitis is a much less dangerous condition than acute appendicitis. The gall bladder is admirably placed for protection and it has a tough wall with a very free blood supply. The bacterial flora in cholecystitis is also less virulent. For these reasons, the risks of gangrene and perforation are less than in appendicitis and, even when they do occur, the process is slower and the resulting peritonitis is usually localized. It cannot be denied that under expectant treatment an acutely inflamed gall bladder is more likely than not to subside. Nature can at times do some wonderful, though perhaps clumsy, surgery in the gall bladder area. Despite these reservations, no one can foresee how an attack of cholecystitis is going to terminate, and quite a good case can be made out for early operation. The mortality in early operation is not "notoriously high"; in the first twenty-four hours there is no more risk than in an ordinary internal operation. In subjects who are bad surgical risks on account of obesity, chronic bronchitis, or myocardial degeneration, the decision calls for mature judgment. One cannot generalize on such cases; each case has to be decided on its merits. It will generally be found that the really bad cases of cholecystitis are of the obstructive variety, with a gallstone firmly impacted in the outlet of the gall bladder. Furthermore, a fulminating attack developing for the first time is more dangerous than an equally acute flaring up of a chronic cholecystitis.

When operation is decided on, the question of removing or draining the inflamed gall bladder may arise. There can be no doubt that cholecystectomy is the better operation, but its performance may be difficult by reason of œdema, adhesions, and hæmorrhage. Still, taken by and large, the results of cholecystectomy in acute cholecytitis are about the best in the whole of biliary surgery.

In England one sees very few cases nowadays of obstructive jaundice due to stone and this is all to the good, for though we now have better methods at our disposal for dealing with them, they are trying cases on account of technical difficulties and the tendency to post-



operative hæmorrhage and hepatic insufficiency. It is easy to miss a stone in the deeper ducts, especially in the intrahepatic portions. In this connection, it is not generally recognized that a gallstone may escape from the gall bladder into the main bile duct and slumber there for weeks or even months without causing jaundice. Many a cholecystectomy has been wrecked by an overlooked stone in the main bile duct. Given dilated ducts, stones can ascend for a considerable distance within the liver. The

figure above shows fifteen gallstones, all of the same brood, and the situations in which they were found at operation.

The menace of cancer is ever present in cases of cholelithiasis and in itself furnishes a potent argument in favour of early operation. I find that in 6 per cent of gallstone cases that come to operation, cancer has developed in the gall bladder, gall bladder fissure, or in the extrahepatic bile ducts. More than half the cases are quite inoperable. In the operable cases of cancer of the gall bladder, the end results of cholecystectomy are bad, for glandular involvement takes place very early. It is very doubtful if the heroic operations which entail excision of a wedge of liver along with the cancerous gall bladder are really worth doing. Cancer of the extrahepatic bile ducts is rare but is more frequently associated with gallstones than is generally supposed. Differential diagnosis from other causes of obstructive jaundice is difficult and often impossible. In my experience it is a particularly lethal form of biliary obstruction and patients usually die before metastases have time to form.

THE ETIOLOGY OF ACUTE APPENDICULAR DISEASE*

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THERE is no subject which thrusts itself so constantly before our attention as that of the acute affections of the appendix. Statistics appear to show that such disease is, if anything, on the increase. Whether that be true or not, one fact is certain, namely that the death rate from such disease is greater now than it was ten years ago. When we consider the widespread knowledge among the laity regarding its dangers, the greatly increased facilities for surgical treatment and for rapid transport, the continued high death rate is undoubtedly a disquieting fact which demands our careful study. We are all aware that prompt surgical intervention is associated with a mortality so low as to be almost negligible. We know also that in cases in which the appendix has ruptured the mortality is considerable, no matter how great the skill of the surgeon and the excellence of the nursing. Our object, therefore, must be to ensure that such cases are dealt with surgically before rupture of the appendix has occurred.

The average time between the onset of the disease and operation is now considerably shorter than it was some years ago, yet the mortality is no less; indeed, it is slightly higher. The explanation of this anomaly lies, I believe, in the fact that the recognition of the serious and fatal type of case is, generally speaking, no better than it was twenty years ago, and this is due to a faulty understanding and teaching of the pathology of the disease. One searches the textbooks on surgery in vain for a clear description of the fundamental facts of the pathology of the early stages of acute appendicular disease, and as a consequence one gains little help from the narration of the symptoms which should be correlated with this pathology.

There are two primary acute pathological conditions which affect the appendix: (*a*) acute inflammation of its wall; and (*b*) acute obstruction of its lumen. These two lesions are fundamentally different; the one comparable to acute tonsillitis, the other—a form of acute intestinal obstruction. We should regard them as entities, the one acute appendicitis, the other, acute appendicular obstruction; the former, a relatively mild and harmless disease; the latter one of the most fatal forms of acute intestinal obstruction.

Pathology

Acute appendicitis.—The appendix contains in its wall a large amount of lymphoid tissue. It is subject, as is the tonsil, quite commonly to attacks of inflammation associated with œdema, swelling, and a certain degree of local peritonitis. Such attacks would be relatively harmless were it not for the fact that in the stage of resolution

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fibrosis of the wall may result in a localized stenosis of the lumen of the organ. If such stenosis be near the cæcal end of the appendix the normal entry and exit of fæcal matter is impeded, and one or more concretions tend to form within the appendix, distally to the narrowed area. The appendix is then left in a condition in which acute appendicular obstruction may at any time supervene.

The infection of the wall of the appendix is, I believe, in many cases blood-borne, and attacks of appendicitis following tonsillitis, and even tonsillectomy, are by no means rare.

Acute appendicular obstruction.—This disease is almost invariably associated with the presence of a concretion in the lumen of the appendix, which concretion suddenly becomes impacted, either in a stenosed area, the legacy of a previous appendicitis, or at a kink due to a tacking down of some part of the appendix by a congenital fold. What happens when a concretion becomes thus impacted depends on the content of the appendix distally to the concretion at the moment of impaction. If there be any appreciable amount of fæcal matter present, great tension develops as the result of putrefaction of this material, and the appendix undergoes tension gangrene, usually within twelve hours. Rupture results, and through the aperture stinking fæcal content, swarming with bacteria, pours into the unprepared peritoneal cavity. A virulent and probably fatal peritonitis results.

This sequence of events can be demonstrated experimentally with ease and certainty. The abdomen of a rabbit is opened, the appendix brought up into the wound, and fæcal matter from the cæcum is milked into the appendix. The appendix is then ligated at its cæcal end, care being taken not to interfere in any way with its blood supply. The rabbit has now got acute appendicular obstruction. What is the result? Within twenty-four hours the animal will be dead from a perforated gangrenous appendix. If but a small amount of fæcal matter is introduced into the appendix before the cæcal end is ligated, an empyema of the appendix results. This may rupture and cause a fatal peritonitis, or it may become walled off and give rise to a localized abscess.

The same pathological sequence may be demonstrated in an isolated loop of ileum in the cat, which has no true appendix. The behaviour of such a closed loop of ileum depends on its content. If it be empty of fæcal matter at the time of isolation a silent and harmless mucocele will usually develop. If a small quantity of fæcal matter from the cæcum has been forced back into the ileum through the ileo-cæcal valve, and the portion of ileum with its cæcal content has been isolated as a closed loop, an empyema of the loop results, and death may ensue from perforation. If the loop of ileum be filled with cæcal content before isolation, tension gangrene of the loop results, with inevitable and rapid death of the animal. Translate these facts into human pathology and you have the explanation of the fulminating gangrenous appendix, which accounts for over 90 per cent of the deaths from so-called appendicitis.

If we now turn to the clinical aspect of the subject we find that a characteristic symptom-complex distinguishes the inflammatory from the obstructive cases.

CLINICAL FEATURES

The clinical picture in acute appendicitis.—It is necessary to preface this description with the observation that probably very many of the cases of this disease do not come before the notice of the surgeon, or indeed of the family physician. The onset is not dramatic. The patient has a feeling of malaise and nausea, has vague abdominal pain, which becomes more or less localized in the right side. There is a rise of temperature or a slight rise in the pulse-rate, loss of appetite, a furred tongue and constipation. The patient calls it a "chill on the stomach" and may take to bed for a day or two, at the end of which time the symptoms gradually clear up. If examined during this attack definite tenderness will be elicited over the right iliac region and appendicitis will be diagnosed and operation recommended. At operation a red, congested and œdematous appendix will be found. The appendix will not be tense or distended; inflammatory œdema of its wall is the salient pathological feature.

Acute appendicular obstruction.—In this disease we have a dramatic clinical picture. Permit me to cite the history of the first case in which I recognized the identity of this disease, for it is typical.

A man, aged 21, attended an international rugby football match, apparently in the best of health. As he left the stadium at 5 p.m. he was doubled up with violent abdominal pain and vomited. The pain passed off in about ten minutes and he accompanied a friend to the railway station, where he was again doubled up with pain and again vomited. He took a cab home and sent for his family doctor, who arrived half an hour later to find him looking pale but practically free from pain. His pulse and temperature were both normal. Abdominal examination revealed some slight rigidity and tenderness in the right side. The doctor diagnosed colic, advised him to go to bed, and to send for him again if the pain recurred. An hour later the doctor was sent for and I was asked to accompany him. We found the patient doubled up with pain, writhing on a couch. He looked anxious and ill, had a rigid abdomen, but his pulse and temperature were both normal. He was removed to a private hospital and the abdomen was opened by an epigastric incision, six and a half hours after the onset of the first attack of pain. The provisional diagnosis was a perforated duodenal ulcer or an internal strangulation. The finding, however, was a tense dark appendix, stippled with green points of gangrene, except in its proximal half inch which was almost normal in appearance. On opening the appendix it was found to contain stinking fluid fæcal matter, pent up beyond a concretion which was impacted in a narrowed area half an inch from the cæcum.

Here we had a condition of tension gangrene of the appendix developing within six and a half hours. The patient had presented symptoms suggestive of an internal strangulation, none of an inflammatory condition. To call this condition acute appendicitis would surely be to use a misnomer. It was this case that led me to conduct the series of experiments on obstruction of the lumen of the appendix and of isolated loops of ileum with varying amounts of fæcal content which have been described.

The symptoms of acute obstruction of the appendix are those which one has the right to expect in a case of intestinal obstruction. Colicky pain felt in the umbilical region, very acute and spasmodic at first, later more continuous, but less acute, as the muscular coats of the appendix become involved in the tension gangrene. The temperature may rise after the first few hours, but frequently it does not until the disease is well advanced. The pulse also may remain practically normal till the time that gangrene has commenced. One symptom is practically always present, *viz.*, a slightly anxious expression on the patient's face and a realization by the patient that something has gone wrong inside. In the retro-cæcal cases the signs may be deceptive, but some tenderness is always to be elicited.

I would have every medical man carry in his mind the picture of the acutely distended, well-nigh gangrenous obstructed appendix, with its foul fæculent content, nigh to bursting, and the terrible responsibility of permitting such an appendix to burst into the unprepared peritoneum.

Increasing experience has convinced me more and more of the essential difference in the pathology of the two outstanding acute diseases of the appendix, and it has been more than gratifying of late years to find practitioners hurrying into hospital for operation cases of acute appendicular obstruction in the early afebrile stage when operation is so easy and so safe. I firmly believe that we may reduce the yearly sacrifice of lives from acute appendicular disease by one-half through a general appreciation and understanding of its early pathology, and it is this belief which has emboldened me to bring to your notice once again this much debated subject.

A study made by John M. Blackford, James M. Bowers and Joel W. Baker, of 401 hypertensive patients (systolic pressure 175 or over) found in 10,000 clinical examinations made in a general clinic from five to eleven and one-half years ago has shown that: (1) The appreciable incidence (1.2 per cent) of hypertension begins in the fourth decade; 5.8 per cent of all patients examined in the fifth decade showed hypertension; 12.3 per cent in the sixth, 22.5 per cent in the seventh, 14 per cent in the eighth, and 10 per cent in the ninth showed blood pressures above 175. (2) Sixty-five per cent of the hypertensive cases in this series are in women; 50 per cent of all patients examined were women. (3) The remarkably greater number of women having hypertension, as compared with men, comes in the fifth, sixth and seventh decades. (4) Family histories of hypertension were noted in more than one-third of all histories. (5) Case of hyptensive disease complicated by goitre, syphilis, diabetes, chronic nephritis and valvular heart disease have each shown by groups no particular difference from cases of pure hypertension. A follow-up study of 222 of 401 hypertensive patients (55 per cent) examined from five to eleven and one-half years ago has been made. Twenty of these have been discarded for statistical study because they were moribund at the time of examination or died shortly afterward from other diseases. The 202 cases remaining, followed from five to eleven and one-half years, have shown: (1) A gross mortality of 50 per cent, a male mortality of 70 per cent and a female mortality of 39 per cent. (2) A mortality about the same for moderate and marked cases, but twice as high in extreme cases. (3) An average duration of life after the first observation of thirty-two months for males and forty-four months for females. (4) An average time since the first examination of 101 living patients of eighty-one months. (5) Known causes of death, thirty-one from cerebral complications, twenty-five from heart disease, eighteen from uremia. Blackford *et al.* have not found any tendency toward recovery in hypertension. Occasionally remarkable exceptions are seen to the general rule of mortality. Women with hypertension sometimes outlive their expectancy. Men almost never do. —*J. Am. M. Ass.* **94:** Feb. 1, 1930.

APPENDICITIS WITH A REVIEW OF FIVE HUNDRED CASES*

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IN the past thirty years the literature on the subject of appendicitis has attained tremendous proportions. The hopelessness of attempting to add to the sum of knowledge of the subject probably accounts for the fact that it is so seldom brought up for discussion in medical associations. It is, therefore, with no conceit that I venture to suggest a stock taking of our knowledge of this widespread disease and our management of the cure of its victims.

I have been unable to verify a quotation from Sir D'Arcy Power, in which he states that appendicitis is now the great endemic disease of the civilized world, since its predecessors—leprosy, plague, typhus and small-pox—have been conquered by advanced hygiene or scientific medicine. Its widespread incidence has been steadily increasing during the past forty years and the theories of its causation have been legion.

Rendle Short made a study of the incidence of appendicitis in Great Britain, from 1890 onward, as associated with changes in the national diet, such as were indicated in the reports of the Board of Trade on the imports of certain food materials. The association seemed to be conclusive until the Great War checked these imports, with no lessening of the relative number of cases of appendicitis in Britain. So far as scientific proof is concerned there is no article of food or method of its preparation that can be held to account for the disease. At the same time the study of Rendle Short shows a definite relationship between dietary habits and appendicitis. The trouble is that a logical sequence of cause and effect cannot be completely maintained. In this connection may I quote one of our fellows, Dr. J. Y. Ferguson, who served as a medical missionary in Formosa. In ten years he did not see one case of appendicitis. After the conquest by Japan new markets were opened in the cities and imported food stuffs, including meats, became commonly used by the people. Cases of appendicitis began to present themselves in Dr. Ferguson's hospital. I have referred to this theory of etiology only as a matter of general interest. A full consideration of the origin of appendicitis could not be given in one short paper.

The theory of specific infection, as put forward by Rosenow, is not yet developed to the point from which a new therapy can be made practical. The old aphorism "an amputation is a surgeon's defeat" is as true as it ever was, but, in the present state of our knowledge, early removal of the diseased appendix is the only means at our disposal in the treatment of appendicitis.

I have just completed a reading of 500 consecutive case histories of appendicitis treated in St. Michael's Hospital from July, 1927, to January, 1929. The data obtained are somewhat inconclusive, as a total of fifty operators were concerned. Of these thirty-one had but one or two cases each. Three hundred and twenty-four were divided among seven surgeons.

Of the 500 cases, 234 were described as acute appendicitis. In these pain and tenderness were present in every case; vomiting did not occur in 26; and rigidity of the right rectus muscle was not demonstrated in 32. Pathological examination of the appendices removed confirmed the diagnosis of acute inflammation 203 times. This is a discrepancy which probably occurs in every large series of cases. That an acute inflammation of the appendix may be diagnosed histologically there must be evidence of con, gestion, œdema, possibly signs of hæmorrhage and infiltration by polymorphonuclear leucocytes, with or without necrosis of tissue. A less complete picture of acute inflammation with infiltration by lymphocytes and mononuclear cells with fibrin is classified as subacute.

The mortality rate in the acute cases was 5.1 per cent. In the chronic cases there were 2 deaths in 266 cases. This mortality rate is exactly the same as that reported by Burgess in the British Medical Association Journal from the Royal Infirmary in Manchester. His study is more elaborate than mine as it covered a twenty-five year period. The mortality rate in the year 1900 was 64.2 per cent; in 1924 it was 5.1 per cent. In the Manchester series there were 798 operations done in the year 1924 and of these

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461 required drainage. In the St. Michael's group of 234 drainage was left in 93 cases. Thus it appears that, roughly, 40 per cent of the operations were upon patients in whom the inflammatory process had been allowed to proceed to abscess or gangrene. After thirty years of experience with this common disease these things ought not to be so.

The hospital itself must be defended by stating that there were only 6 deaths among 193 patients in public wards. This gives a mortality rate of 3.1 per cent, which is considerably better than the Manchester figure of 5.1 per cent. It does not, however, read as well as Niemeir's report from the Hamilton General Hospital, for 1928, in which a rate of 2.3 per cent is given.

The cause of death in every instance was diffuse peritonitis, and this, to put it as gently as possible, means regrettable delay in diagnosis or in the application of the remedy.

I have carefully enquired as to the length of time between the onset of pain and the sending of the patient to the hospital. Only 23 operations were done within twelve hours of the onset of the disease. At these, three appendices were found ruptured and two were in a state of gangrene.

My former chief, the late Dr Silverthorn, continually emphasized the hazard taken in allowing the patient to enter a second twelve-hour period after signs of appendicitis had declared themselves. At the end of 12 hours the patient may, and in fact usually does, experience relief of pain. This is due, unless the obstruction within the appendix has been relieved, to lessened sensibility following œdema or necrosis. The second onset of pain is accompanied by some degree of surgical shock and may occur any time after the first period of twelve hours. This is the pain of perforation. An operation done before rupture or abscess formation occurs means a patient restored to normal health and economic usefulness within a few weeks. Delay always results in slow convalescence, and usually in permanent impairment of health, with consequent economic loss.

How may we account for the tardiness displayed in securing relief for these patients? Twenty-three were operated upon within 12 hours; 177 came to the surgeon anywhere up to seven days after the onset of the disease. Are the patients or the patients' friends to blame? In a few cases they may be, but as a rule, I believe, they are not. Experience has taught the people the necessity for early interference, and serious resistance to the idea of operation is, in my experience, not common. The reverse is more usually the case. I was called on a Sunday afternoon to see a gentleman in whom I diagnosed acute appendicitis and suggested removal of the appendix. His wife was out for tea and I offered to return in a couple of hours that I might explain matters to her. "You have diagnosed appendicitis?" "Yes, Sir." "The treatment is operation?" "It is." "Why wait?" I hastened to oblige him. The difficulty is not from resistance on the part of the patient so much as it is with our own making of a diagnosis. This may call for much skill and mature judgment. Again I use an unverified quotation, this time from the late Sir Frederick Treves. Referring to the position of the appendix within the peritoneal cavity he says, "its only constancy is its inconstancy."

Elsewhere I have published a series of cases in which all of the early symptoms seemed to point to an affection of the genitourinary tract These are instances in which bladder irritation, ureteral colic, or even bloody urine result from an inflammation in a contiguous structure, namely an appendix. Again, the appendix may lie along the ascending colon or under the ileo-cæcal juncture. The parietal peritoneum in the anterior abdominal wall is not inflamed in the early stages and the classical sign of right rectus rigidity is not found Should the inflamed tip of the appendix lie in the pelvis it will be found by palpation through the rectum.

The four elements in an examination leading to a diagnosis of acute appendicitis are the history, palpation, temperature and pulse changes, and leucocyte count. I have called attention to the infrequency of irregularity in the histories studied. Cramping pain of definite onset, with subsequent vomiting, were found in all but 26 of the 234 cases. Palpation found tenderness, superficial or deep, in every case, and local or general rigidity in all but 32. I have not the number of those in which a rectal examination made or confirmed this part of the diagnosis Fever was seldom marked. In 109 cases the temperature before operation was one degree or less above the 98.4°F. which we call normal. Fever indicates general systemic resistance to infection and should not be considered as an essential finding in the early stage of a purely local inflammation. The explanation most commonly given for delay is an absence of fever when the patient is first seen by

the physician. A clinical thermometer is a most useful instrument, but in a case of acute abdominal pain its chief value is found in excluding the occasional instance of central pneumonia with diaphragmatic pleurisy. An increasing pulse rate is of undoubted significance. The leucocyte count is always of value. Three years ago, Dr. T. A. Robinson stated in the Bulletin of St. Michael's Hospital that a white cell count of 12,000 per c.mm. of blood in cases of acute appendicitis was associated in every case with a pathologist's report of leucocytic infiltration beyond the submucosa of the appendix. In this series a count of the leucocytes was made in practically every case. In one case of gangrene of the appendix the count recorded was only 8500. In a fulminating case it was 29,000 twenty-four hours after the onset. Peritonitis or abscess was always associated with a leucocytosis of fifteen to twenty thousand or more. The making of a count is not necessarily a task for a laboratory. I have told before of a young physician who told me, quite as a matter of course, that when he visited a patient at three o'clock in the morning the leucocyte count was 30,000. He is, I fear, a rara avis among practitioners.

In reading the histories in this series of cases I was struck by an item in one of them. In the forms used in St. Michael's Hospital there is a blank space calling for a note from the surgeon as to the condition found and the operative procedure carried out. In this particular instance the operator write, "Appendectomy—simple." A study of any considerable number of cases makes one wonder how often the operation is to be considered a simple thing. I once watched a master surgeon and a teacher of surgeons remove an appendix. He was a very skilful man but it took an hour and a quarter for him to complete the operation. He said, "I was not very brilliant to-day." I answered that I had settled in my own mind that a man who could properly handle any given case of appendicitis might undertake almost any operation in abdominal surgery. The tyro on a hospital staff is supervised or assisted by his experienced senior. The tyro who is not so protected must rely upon his own skill and his own judgment. I would be accused of special pleading were I to labour this point, so I leave it with the statement that, however "simple" the operation may occasionally be, it often presents difficulties so formidable as to tax the resource of the most skilful surgeon.

The subject of chronic appendicitis requires much study. The follow up systems in Toronto hospitals are not sufficiently organized to make any contribution that can be considered as final. I am deliberately ignoring 300 cases of fibrosed appendix or chronic appendicitis with histories of vague pains, nausea, or indigestion, persisting for months or years. The appendices of these patients have been removed. What is their subsequent history? Some are no doubt well. A great many of them will be taking "internal baths" or special diets, or be having cholecystograms by this time. A history of recurring attacks of appendicitis is one thing; a vague malaise with a constantly tender cæcum is quite another.

The acute, the recurring, and the chronic forms of appendicitis are alike in one particular. They are treated after operation upon the same principles. I am not going to elaborate upon details of post-operative care. Dr. R. V. B. Shier, in a paper published in *Surgery, Gynæcology, and Obstetrics* in 1921, wrote the most common sense and thorough article I have ever read on this subject. Since then we have had the benefit of a great contribution from R. I. Harris while he was on the staff of the Hospital for Sick Children. This is the continuous administration of glucose or chloride solution by the intravenous method. Proctoclysis and hypodermoclysis are useful, but the continuous exhibition of fluids by the intravenous route is an anchor to windward that has enabled many a patient to ride in safety through a storm of post-operation ileus or of peritonitis. It is also useful in the cases of inflammatory obstruction. Whether or not an enterostomy must be done, the loss of fluids and of body chlorides may be made up, and the nourishment afforded by the glucose appropriated.

In a few cases benefit was obtained by the administration of *B. Welchii* antitoxin. In one or two instances it was given with the glucose solution by the intravenous method.

The post-operative complications in the acute cases were varied. As I have pointed out there were 93 in which drainage was required, or 40 per cent of the total number. In most of these abscess or diffuse peritonitis had occurred. These conditions head the list. The next in importance is bronchitis or pneumonia. A number of patients were operated upon during an epidemic of influenza in December and January, and the two diseases were associated, as in one child of 11, with a lobar pneumonia of three days'

standing. A gangrenous appendix was removed under local anæsthesia supplemented by gas and oxygen given for four minutes. The number of pulmonary complications of all sorts is 30. The complications in the chronic cases ranged from neurasthenia to cystic ovaries. We had been improving our records in the matter of pulmonary complications by the use of warmed ether for anæsthesia, but the epidemic referred to gave a set-back to the improvement.

Acute appendicitis during early pregnancy occurred three times One case recovered after a further complication of phlebitis in both lower limbs. The other two aborted but recovered Hiccough was present in three cases. Subphrenic abscess and fæcal fistula occurred once each. In one case the appendix was not removed The drainage of a large abscess resulted in the recovery of the patient.

The right rectus incision was seldom used The group of operators apparently agree as to the superiority of the split muscle incision as an exposure of the acutely inflamed appendix This incision, widened if necessary by opening the sheath of the rectus muscle, ensures that the operative field, protected by carefully placed packing, is limited to the outer aspect of the cæcum. A degree of safety is thus secured that cannot be had should the matted coils of intestine and omentum be disturbed by an approach from the medial aspect. In a number of cases the appendix was removed by first separating it from the cæcum and then securing the vessels in the mesentery by the application of forceps from the base toward the tip. Mobilization of the cæcum was thereby reduced to a minimum in cases in which the mesentery was short or the appendix retrocæcal in position.

Gentleness in handling inflamed intestine is a matter of training and temperament. I have made some deductions from the amount of morphine necessary in the first two days after operation.

A mass of other data bearing upon the use of eserine and pituitrin, the value of poultices, the necessity of catheterization, the place of enterostomy, and the prevention of wound infection must wait for consideration at another time and place.

CHRONIC ARTHRITIS*

BY A. A. FLETCHER, M.B.,

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CLINICAL experience points to an obscure or multiple etiology for chronic arthritis or, as it is sometimes called, chronic arthritis of unknown etiology. These cases are to be distinguished from the group of arthritides of known etiology. Some of these, for example, are those due to specific infecting agents, such as the tubercle bacillus, pneumococcus, gonococcus, influenza bacillus, dysentery bacillus, and the pyogenic organisms, or those in which the arthritis is part of, or a complication of, some disease such as gout, the purpuras, hæmophilia, or tabes. These cases are a small fraction of the whole. The remainder constitutes the large majority and, while some may run an acute or, at least, a subacute course, custom has sanctioned the application of the term "chronic arthritis."

In general, cases of chronic arthritis tend to fall into two broad subdivisions. Those of childhood and early adult life are characterized, especially in the early stages, by swelling or œdema of the periarticular tissues. In this the disease simulates rheumatic fever and is usually called "rheumatoid arthritis." Many of these patients, at some stage, show atrophy of bone or muscle and, for this reason, these cases may be called "atrophic arthritis." By some this whole rheumatoid group is called "atrophic arthritis." Most of the cases occurring in later life belong to a second group which shows fibrillation of the cartilage and, as Timbrell Fisher[1] suggests, possibly secondary to this cartilage change new bone formation takes place at the articular margin. For these the name "osteo-arthritis" is given or, on account of the occurrence of new bone production, "hypertrophic arthritis." Some cases show the changes characteristic of both types. Many writers have held that, at times,

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one factor can be shown to play an especially prominent part, either etiologically or therapeutically, and that certain cases may be separated and specially classified. This has resulted in a somewhat confusing and overlapping terminology, such as, focal arthritis, infectious arthritis, metabolic arthritis, the arthritis of the menopause, the arthritis of psoriasis, traumatic arthritis, or toxic arthritis. Viewed as a whole, however, patients with chronic arthritis have much in common. They show a high incidence of focal infection; they are susceptible to changes in the weather; they tire easily; and fatigue aggravates their symptoms. Various physical agents moderate the severity of the symptoms, sunlight, physiotherapy, hydrotherapy, massage, and lastly, variations in diet.

As taught by Schüller, Bannatyne, Poynton and Payne, and others[2], rheumatoid arthritis is most likely a bacterial process. The evidence in this regard cannot as yet be considered conclusive. An organism may be found in the blood stream, in the joint tissues, or in the glands draining the joint, but this organism is not a constant one, according to the findings of different observers. At other times the tissues and blood stream appear to be sterile. The organisms, when found, are usually of low virulence such as might be found in a healthy mucous membrane. It is believed that the organisms come from a focus of infection but, while foci frequently can be found, radical treatment is often disappointing. In fact, it has been suggested that the presence of a focus of infection is an expression of a state of ill-health as much as a cause of disease. Not infrequently there is doubt as to the bacterial nature of certain cases. At times the exciting cause appears to be chemical or toxic; at other times physical agents appear to be the immediate cause, such as, trauma or strain. In osteoarthritis the part played by infection is less evident, and other factors—physical, chemical, endocrine—seem more frequently to be the exciting agents.

In most diseases of bacterial origin it is recognized that many factors contribute to or are necessary for the development of the infection. These are the so-called *predisposing causes*. In rheumatoid arthritis, in view of the obscurity of the immediate cause, these predisposing causes may well receive more attention. If the disease is an infectious process, the non-specificity and low virulence of the organism must point to a state on the part of the patient highly favourable to its invasion. In 1907, Sir A. E. Garrod[3] wrote "Any condition which tends to lower the standard of health may act as a disposing cause of rheumatoid arthritis." Clinically, some of these are, heredity, constitution, fatigue, environment, occupation, previous disease, worry, anxiety, age, sex, and, lastly, and probably most important, malnutrition. The belief is not new that chronic arthritis and malnutrition are closely related. It is strong among the patients themselves. It has been supported by much careful clinical observation. Guelpa employed his system of fasting for the treatment of arthritis. Pemberton[4], for many years, has urged the careful control of diet in the treatment of this disease, advising a general reduction of the dietetic load, restricting especially the carbohydrate. A study of patients with arthritis carried out nine and ten years ago by the writer[5] convinced him that much was to be accomplished by a readjustment of diet balance and also by the liberal administration of vitamins. Recently Rowlands[6] has advised the use of vitamin B in concentrated form.

Further evidence bearing on the relationship of pre-existing bodily states to the development of arthritis is furnished by the observations initiated by Goldthwaite and Brown[7] many years ago. They recognized the frequent occurrence of enteroptosis in arthritis, and successfully treated patients by various measures calculated to correct this and other disturbances of abdominal function. Others have made observations similar to theirs. Rea Smith and Taylor have recently pointed out the frequent incidence of abnormalities in tone and haustral markings of the colon, as shown by x-ray examination. These abdominal disturbances have been considered to be the result of some constitutional, physical, or postural defect.

This high incidence of colonic disturbances in arthritis has been observed in a large group of patients in the medical wards of the Toronto General Hospital. This study has been carried out in conjunction with the Department of roentgenology[8]. It was begun in the belief that the colonic disturbances were nutritional in origin, and that patients showing these lesions would be those which experience most benefit by diet therapy. Atony is most frequently seen, sometimes throughout the entire colon, at other times confined to the cæcum and ascending colon. Haustral markings may be decreased or even absent. There may be a marked increase in the length of the colon, resulting in looping or festooning, and the usual shape of the colon may

be entirely lost. The belief that these disturbances are nutritional in origin was more or less established by the change which can be brought about by certain dietetic measures resulting in partial or complete re-establishment of the normal radiological appearance of the colon. These observations are in keeping with those made by McCarrison[9] in monkeys fed on autoclaved diets. Changes occurred in the colon which he described as "a ballooning of the large bowel and a tissue paper-like structure of the viscus." These results he attributed to deficiency of vitamin B, and his work has been confirmed in other animals by Cramer, Rowlands, and others.

The improvement in the x-ray appearance of the colon has been brought about by certain specific changes in diet. Vitamin B* has been given in large quantities in the form of wheat germ, bakers' yeast, fresh vegetables, liver, and eggs. Total calories have been reduced to a maintenance or, in suitable cases, even below a basal level. The effectiveness of vitamin B seems to vary indirectly as to the amount of the total diet. Carbohydrate, especially, appears to inhibit its effectiveness. Many patients with these colon disturbances actually prove to be intolerant of carbohydrate and this intolerance sometimes, but not always, persists indefinitely. As a rule 50-70 grams of protein are given in the form of meat, fish, fowl, eggs, milk, and glandular food; carbohydrate reduced to 50 grams; and the fat, largely as cream and butter, varying from 50 to 150 grams, according to the individual requirements.

The influence of diet balance upon the production of vitamin B deficiency was pointed out by McCarrison. Funk[10] found that the ease of producing this syndrome was, in general, in proportion to the amount of carbohydrate administered in the form of polished rice. H. M. Evans and Lepkovsky[11] have shown that fat exerts a sparing action on the antineuritic vitamin. In other words, the measures carried out to re-establish the normal tone and motility of the large bowel in chronic arthritis are the reverse of the measures used experimentally to induce vitamin B deficiency. Patients with these disturbances of the colon are benefited while undergoing this treatment, sometimes very much so. The arthritis may become quiescent and in some patients clears up entirely. Besides this, they may experience much general improvement, increased strength, better appetite, and improved bowel function. Observations have been carried out in patients with various forms of rheumatoid arthritis and osteoarthritis. Colonic disturbances may be seen in patients with both types of arthritis, including many patients with the so-called arthritis of the menopause. Some patients with rheumatoid arthritis were total invalids and had been suffering from their disease for as long as ten or twelve years. The best clinical results are seen in patients with rheumatoid arthritis, but good results were by no means confined to this group. There seems to be no doubt that these colonic lesions have been in existence over long periods of time, and that dietetic measures must be continued over an extended period. The mucous membranes may have undergone much structural change and improvement may be tedious. We apparently are dealing with a chronic deficiency state; vitamin administration and dietetic control must be used in treatment more vigorously than in the acute experimental disturbances, and in some cases must be continued indefinitely.

Many of the patients studied showed foci of infection and might reasonably be called cases of infectious arthritis. If the disease is infectious, clinical experience strongly points to the existence of some predisposing state. From an experimental standpoint no means is so effective in creating lowered resistence to infection as the use of deficient diets. Almost any type of diet deficiency is liable to result in infection and the deficiency syndrome itself may be an infective process. This is especially true of diets deficient in vitamins A, B, or C, or of protein. It is suggested that in many of these infectious cases malnutrition creates a state favourable for the development of the infection.

The colonic disturbances seem to be a manifestation of chronic deficiency in vitamin B, but other food factors must at times contribute to the onset of the arthritis. We know that many patients receive much benefit, for example, from sunlight; others from cod liver oil, especially from cod liver oil concentrate;* others from correction of over- or under- nutrition.

These considerations serve to remind us of the probable complexity of the predisposing

*The term "Vitamin B" is used to cover both the antineuritic Vitamin B_1 and the antipellagric Vitamin B_2. It is probable that the thermolabile Vitamin B_1 is especially associated with these colon disturbances.

*Supplied by Ayerst, McKenna and Harrison under the trade name of Alphamin.

state. In osteoarthritis there is an almost equal incidence of colonic disturbances, and, whatever may appear to be the immediate cause, treatment by suitable dietetic means will be of value. It is not advised that diet be used alone. Treatment of chronic arthritis should embrace many measures, and should take into consideration the various known predisposing and exciting causes. Belief is expressed that a large number of patients show in these colonic disturbances manifestations of malnutrition which has contributed to the development of the disease, and that certain dietetic measures exert an important influence on its course.

SUMMARY

1. The complexity of the etiology of chronic arthritis is emphasized.

2. Malnutrition is believed to be one of the important contributory or predisposing causes of this disease.

3. The disturbances of tone and motility of the colon observed in many patients with chronic arthritis are manifestations of malnutrition. These disturbances antedate the development of the arthritis.

4. Under the influence of certain dietetic measures, notably the liberal administration of vitamin B and the restriction of carbohydrate, the radiological appearance of the colon tends to become normal.

5. These dietetic measures exert a favourable influence on the course of the arthritis in those patients showing colonic disturbances.

6. In cases of chronic arthritis where the disease is secondary to a focus of infection it is probable that malnutrition at times creates the state favourable to the development of this infectious process. In other cases the colon itself is probably the source of the infectious or toxic agent causing the disease.

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CLINICAL VALUE OF SERA AND VACCINES.—The recent survey by Hektoen and Irons concerning the popularity of vaccines indicates that these agents are in disfavour with an overwhelming majority of physicians. Ralph A. Kinsella asserts that one has only to compare the catalogue of any prominent drug company of twenty years ago with the most recent catalogue of the same company to realize that the treatment of infectious diseases has been changed from one in which drugs played the most important part to one in which such biological products as sera and vaccines have assumed a great prominence. A visit to the drug room of the average hospital confirms the idea that vaccines particularly are widely used. In towns of comparatively large size it may be impossible to find a package of type I antipneumococcus serum during the winter, although numerous preparations of vaccines and other so-called antigenic agents are always available. This condition reflects an attitude on the part of the physician which is due to the lack of uniform teaching regarding the nature of infection, its etiology, and the means by which an infectious disease may be neutralized. The medical student hears contradictory evidence in many fields of bacteriology. At the same time the information which he receives concerning antigens and antibodies is so rigidly definite that he leans to a belief in specificity and is inclined to accept as specific the various agents for immunization, however loosely supported they may be by the uncontrolled observations of clinicians or the claims of salesmen. The outstanding success of smallpox vaccine, the dramatic discovery of the Pasteur treatment, and the apparent usefulness of typhoid vaccine and of vaccination with diphtheria toxin-antitoxin mixtures had led investigators to the hope and to a large extent to the belief that similar success may be obtained in the field of other infectious diseases. The manifest failure of most of the attempts to produce effective vaccines and sera emphasizes the fact that there are many features of an infectious disease that are still unsolved. There still numerous infections concerning whose etiology dispute is prevalent. For many of these infections vaccine treatment has been devised by the original investigators, and for others vaccines are furnished by the manufacturers without much foundation in experimental facts. It is impossible to consider in detail all these instances, but when one considers the number of vaccines about which there is little or no dispute one finds oneself with few vaccines left, except those for smallpox, rabies, typhoid and diphtheria. Concerning the use of nonspecific vaccines, it can be said that definite clinical effects are produced frequently which lead both the patient and the physician to feel that some good has been accomplished. It has been shown, for example, that such nonspecific reactions may temporarily suppress a bacteriemia, but the literature fails to indicate that the use of nonspecific products has produced permanently beneficial effects. The continued use of these products need not be discouraged altogether, but it is far better to await the results of further studies by those whose lives are devoted to investigation of this type than to plunge madly into the promiscuous use of vaccines and sera.—*J. Am. M. Ass.* **93:** Nov. 16, 1929.

THE DIFFERENTIAL DIAGNOSIS OF SUPERFICIAL GLANDULAR SWELLINGS*

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A LOCAL or general enlargement of the superficial lymph-nodes is not an uncommon manifestation of disease. Diagnosis of the cause of the enlargement is often difficult, yet very important from the standpoint of prognosis and treatment. It may be of interest, therefore, to review briefly the clinical causes of local and general glandular enlargements, and discuss the character, development, distribution and duration of the swelling in different conditions, together with the associated local and general symptoms that may be present.

Local glandular enlargement is commonly caused by septic infection, tuberculous disease, Hodgkin's disease, lymphosarcoma, and metastases from a new growth, while general enlargement, *i.e.*, cervical, axillary and inguinal, may be caused by septic infection, syphilis, German measles, lymphoid leukæmia or aleukæmia, Hodgkin's disease, glandular fever, and, rarely, lymphosarcoma and tuberculous disease.

Glandular enlargements due to septic infection are more often local than general, more often acute than chronic, and rarely present any difficulty in diagnosis. The onset is sudden, the glands are discrete, tender, and often painful, never very large, and the ones involved are those draining the infected area, commonly a lesion of the skin or mucous membranes of the upper respiratory tract. In very severe infections the glands may suppurate. A careful examination of the area drained by the glands affected will usually reveal the primary source of the infection. In syphilitic infection a local enlargement begins in the groin, becoming generalized in the secondary stage of the disease. The glands are small, firm, mobile and painless. A history of exposure to syphilis and a Wassermann test of the blood will serve to clear up the diagnosis. In German measles the skin eruption suggests the cause of the enlargement. In secondary malignant disease the glands are hard, show a progressive increase in size, and tend to become fixed to adjacent structures. Ulceration may take place. The presence of hard glands showing a tendency to fixation to adjacent structures, occurring in a patient of middle age or over, should suggest the possibility of metastases from a new growth, and indicate a search for the site of the primary growth, most commonly a carcinoma.

Probably the most common cause of local glandular enlargement is tuberculous disease. The glands first involved are those at the angle of the jaw, the submaxillary, and the superior deep cervical. Later, the infection may spread to the inferior deep cervical glands. In the beginning the enlargement is slow in development and painless. If the glands become caseous general symptoms develop; malaise, fatigue and an evening rise in temperature. If softening or suppuration occurs they become tender and painful and local signs of inflammation appear. At this stage a periadenitis is present and groups of adjacent glands become matted together. If healing takes place fibrosis and calcification occur, and the glands become adherent to the deeper structures and the skin. A local chronic enlargement of glands beginning near the angle of the jaw, occurring in children or young adults, is very suggestive of tuberculous adenitis. This is especially true in districts where the milk is not pasteurized. If the glands are matted together, vary in consistency, and especially if they are adherent to the skin or deeper structures, the cause of the enlargement is almost certain to be tuberculous disease. Tuberculous adenitis of the axillary glands, usually secondary to tuberculosis of the breast, may occur. Very rarely a generalized tuberculous involvement of the lymph-nodes is found.

The next most common cause of a local glandular swelling is Hodgkin's disease, sometimes referred to as malignant granuloma, lymphogranuloma, or lymphadenoma. In the initial stage a local group of glands is involved, most commonly in the postauricular or supraclavicular areas. After weeks, months, or even years, glands in other areas—the other side of the neck, beneath the clavicle, in the axilla and in the

*Paper read at the annual meeting of the Ontario Medical Association, Hamilton, May, 1929.

groin—enlarge. In contrast with lymphosarcoma, which will be mentioned later, Hodgkin's disease rarely, if ever, involves the tonsil or lymphoid tissue of the pharynx. In the beginning the glands are discrete, soft and elastic, mobile and painless, and may reach a considerable size before being noticed by the patient. Later, they become firmer, never hard as in secondary malignant disease, and never adherent to skin or deeper structures. If the mass is large it may be impossible to palpate individual glands in its centre, but at the edge they are easily made out. The size and number of enlarged glands vary in different areas, being larger and more numerous in the area first involved. Fortunately, in Hodgkin's disease other more or less characteristic manifestations of the disease are present which are of value in differential diagnosis. The spleen is palpable; fever is almost always present; and pruritus is a common early manifestation of the disease. The patient complains of fatigue, becomes pale, begins to lose weight, and finally dies of cachexia, complications, or an intercurrent infection. The course of the disease varies greatly in different cases, depending upon the extent and rapidity of the glandular enlargement and the severity of the general symptoms.

A local glandular enlargement very often confused with Hodgkin's disease is that due to lymphosarcoma. According to Kundrat, who gave the first clear description of this condition, lymphosarcoma arises in a local group of lymph-nodes, or from lymphoid tissue in the tonsil, pharynx, or intestinal tract. In the lymph-nodes a rather marked local enlargement occurs, the individual glands become confluent, adjacent structures become infiltrated, and neighbouring lymph-nodes enlarge. If the growth originates in the tonsil a progressive enlargement occurs, the glands at the angle of the jaw or beneath the sternocleidomastoid are involved, and, with infiltration of the pharynx, the glands on the other side of the neck become affected. General glandular enlargement, as in Hodgkin's disease, or the formation of metastases in distant parts of the body rarely occurs. General symptoms, as fever, pruritus and sweating, common in Hodgkin's disease, are absent. The spleen is not enlarged.

The common causes of well-marked general glandular enlargement are lymphoid leukæmia and aleukæmia, glandular fever and, as has already been mentioned, Hodgkin's disease in the later stages. In chronic lymphoid leukæmia and aleukæmia the first clinical manifestation is a painless, definite enlargement of all superficial lymph-nodes. The tonsils are often enlarged. The glands are soft, mobile, fairly uniform in size in all areas and never become matted together or adherent to adjacent structures. The spleen is nearly always easily palpable and may be quite large. In every case of general glandular enlargement a complete hæmatological examination is indicated. If lymphoid leukæmia is present the white blood corpuscles are increased in number, usually to 100,000 or over, due to an absolute and relative increase in lymphocytes; if an aleukæmia is present the total number may be normal, or less than normal, but the blood smear will show the typical picture of lymphoid leukæmia. In young children, and occasionally in adults, lymphoid leukæmia runs an acute rather than a chronic course. The clinical picture is one of moderately high fever, progressive anæmia, gangrenous ulceration of the throat, with hæmorrhage from the mucous membranes. The disease runs a rapid course and the patient dies in a few weeks or months.

Glandular fever, or infectious mononucleosis, may present difficulties in diagnosis, unless one is familiar with the clinical picture presented by this disease. It occurs chiefly in children and young adults. The usual onset is characterized by malaise, headache, fever to 101° or 103°, sweating and pharyngitis. Swelling of the cervical and submental lymph-nodes occurs, followed later by a general enlargement in the majority of cases. They are smaller than in lymphoid leukæmia, being 1 to 2 cm. in size and firm, mobile and tender. The tonsils are often enlarged and the patient may complain of fullness in the throat from the swelling of the lymphoid tissue in the pharynx. At the end of a week the spleen is palpable and often tender. The blood examination shows a moderate leucocytosis of about 15,000, with an increase of lymphocytes to over 70 per cent. In the third week the temperature and leucocyte count return to normal, and the swelling of the glands begins to subside but they may remain palpable for some months. Recovery is rapid and complete. It is in the second week of the disease that the physician is so concerned over the diagnosis, for at this stage the clinical picture most closely simulates acute lymphoid leukæmia, a condition that is always fatal. If a complete investigation of the case is not possible, the absence of anæmia, purpura, and ulceration of the throat makes

acute leukæmia very improbable. The rapid improvement which takes place in the third week of glandular fever excludes acute leukæmia.

In the differential diagnosis of superficial glandular swellings little difficulty is experienced in the diagnosis of adenitis from septic infections, syphilis, etc. If a hæmatological examination of the blood is made in all cases of general glandular enlargement the possibility of lymphoid leukæmia or aleukæmia and glandular fever as a cause can be determined. In the absence of characteristic changes in the blood, Hodgkin's disease as a possible cause of general glandular enlargement must be considered. A history of a local enlargement, later becoming more or less generalized, the absence of tonsillar involvement, and the presence of a palpable spleen, with fever and sweating as associated symptoms, is very suggestive of Hodgkin's disease.

The greatest difficulty in differential diagnosis lies between Hodgkin's disease in the localized stage, lymphosarcoma, and tuberculous adenitis in its early stage when the glands are discrete and mobile. As has already been pointed out, a chronic enlargement of the glands at the angle of the jaw occurring in children living in districts where milk is not pasteurized is most often due to tuberculous disease. If the glands vary in consistency, or show a tendency to matting, they are almost certain to be tuberculous. In Hodgkin's disease the postauricular or supraclavicular glands are more commonly involved first; they are usually larger and do not become matted together, except in very rare cases where there is a co-existing tuberculous infection. Fever, sweating and loss of weight may be present in both conditions. On the other hand, pruritus is absent in tuberculous disease, and the spleen is seldom as large as in Hodgkin's disease. The differentiation between Hodgkin's disease and lymphosarcoma of Kundrat is more difficult. Some observers do not attempt to differentiate between these two conditions. The clinical picture, at least in the later stages of the two diseases, is quite different. Lymphosarcoma may begin in the tonsil or lymphoid tissue in the pharynx. Hodgkin's disease never begins in these structures. Lymphosarcoma tends to remain localized to a local group of glands. Hodgkin's disease begins as a local enlargement, and, later, with the involvement of glands in other areas, the enlargement becomes more or less generalized. Unless lymphosarcoma begins in the spleen this organ is not involved, whereas in Hodgkin's disease it is usually palpable, and in the later stages both liver and spleen may be markedly increased in size. Pruritus is absent in lymphosarcoma, and fever, apart from a complicating infection, is usually absent. Lymphosarcoma is less resistent than Hodgkin's disease to the effect of x-ray treatment. If these points of difference between the two conditions are remembered Hodgkin's disease and lymphosarcoma, as causes of superficial glandular enlargement, can be differentiated clinically in most instances.

As yet no mention has been made of the microscopical examination of an excised gland as an aid in diagnosis. This has been intentional. Among clinicians the impression is too widespread that the excision of a gland for microscopical examination is essential in the diagnosis of superficial glandular enlargements. This method for making a positive diagnosis has definite limitations. Too often the clinician advises the removal of a gland for microscopical examination without realizing that it is impossible for the pathologist to differentiate by histological examination between glands from cases of lymphoid leukæmia or aleukæmia, lymphosarcoma, or certain cases of Hodgkin's disease without a report of the clinical examination of the patient and the results of the hæmatological examination of the blood. This information alone is usually sufficient for the making of an accurate diagnosis. The microscopical examination of an excised gland is chiefly of value in the diagnosis of atypical cases of tuberculous adenitis.

SUMMARY

In this rather brief review attention has been called to the common causes of local and general superficial glandular swellings; the chief clinical characteristics of each have been described, and certain distinguishing features which are of value in differential diagnosis have been stressed.

MASSIVE COLLAPSE OF THE LUNG*

BY H. H. MURPHY, B.A., M.D.,

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THE condition of massive collapse of the lung has been defined by Sir John Rose Bradford as "an unusual condition in which the lung without the presence of any gross lesion, such as bronchial obstruction, pleural effusion, etc., interfering with the free entry of air becomes airless to a greater or lesser degree." This atelectatic collapse is very different from collapse of the lung in pneumothorax. The lung does not leave the chest wall. It becomes smaller in size and to compensate for this shrinkage the trachea, heart and other mediastinal contents are displaced to the affected side, the diaphragm is raised, and the intercostal spaces narrowed, with depression of the chest wall on the affected side.

The condition was first described by W. Pasteur in 1890. He named the condition and reported 34 cases following post-diphtheritic paralysis of the diaphragm. Since that time numerous observers have reported their cases. Amongst these is Dr. F. A. C. Scrimger, of Montreal. For those interested excellent bibliographies are given in Sante's article[1], read at the second International Congress of Radiology in Stockholm, also in H. K. Mohler's article[2] in the *American Journal of the Medical Sciences* for April, 1929.

All observers agree that the condition occurs most frequently after operative treatment for inguinal hernia and appendicitis. Berry[3] reports four cases following paravertebral thoracoplasty for pulmonary tuberculosis. I have found no cases reported following operations on the head and neck. Several cases have been observed following gunshot wounds. Sir John Rose Bradford reports one case in which a slight wound of the chest wall was followed by collapse of the lung on the opposite side. No anæsthetic had been given or operative treatment undertaken in this case. The majority of cases reported give a history of injury of some kind, perhaps only a fall on the buttocks, perchance the injury of surgical manipulation. In 1924, a case was reported complicating acute poliomyelitis. Others have reported massive collapse as a complication of pneumonia, pleurisy, hydrochloric acid poisoning, foreign bodies in the bronchi, and carcinoma of the stomach.

The condition may involve a lobule, a lobe, one entire lung, or even both lungs. The latter is, of course, immediately fatal. It, thus, must be considered as a possible cause of sudden death during or after operative procedures. Two such cases are reported, one after operative treatment for uterine fibroids, the other after septic abortion.

In those cases which have come to autopsy, obstruction of the bronchi has not been proved, although this does not disprove the possibility of such a thing being the cause, as such obstructions might be dislodged in the death agony or by rough handling in the removal of the lungs. The general opinion is that there is always a thick fibrinous exudate over the diaphragmatic surface and the pleura, and a thick viscid bronchial secretion is always present. It is generally believed that a combination of these two conditions, with some suppression of the cough reflex, are important factors in the etiology of the condition.

The symptomatology, naturally, is varied, but the majority of cases fall into one of two groups.

1. The respiratory type, in which the patient exhibits the usual symptoms of pneumonia: fever, leukocytosis, cough, chest pain, cyanosis, expectoration which may or may not be bloody.

2. The symptomless type, in which a patient develops fever and leukocytosis but practically no respiratory signs, and the elevation of temperature, pulse, and white blood cell count are interpreted in terms of the initial lesion.

The physical signs in marked cases are unequivocal, displacement of the heart to the affected side, depression of the chest wall, with the usual signs of consolidation. In other words, it is always easy to recognize the text-book picture of any disease, provided that the clinician has it in mind. But what of the minor cases, the atypical cases, with few or no respiratory symptoms? Is it any wonder that these frequently escape detection unless a bedside radiographic examination is made? "A picture is worth 10,000 words." This proverb is certainly true of massive collapse of the lung, because the

*Read before the Section of Radiology, at the Annual Meeting of the Canadian Medical Association, Montreal, June 17, 1929.

radiographic evidence is so clear, so unmistakable. An even density involves one half of the thorax, the intercostal spaces are narrower, the trachea is always displaced towards the affected side, and this may be the clue to an upper lobe density when the cardiac shadow is not displaced. The displacement of the heart may vary from the slightest degree up to extreme dextrocardia.

We have two cases to report, both of which have occurred within the past six months.

CASE 1

I. G., a male, aged 24. This man was struck in the left lumbar region on October 30th, 1928, by the end of a piece of square timber about twenty feet long. Radiographic examination after the accident showed a fracture of the eleventh left rib and the transverse processes of the first four lumbar vertebrae on the left side. There was also a fracture of the spinous process of the third lumbar vertebra. The left chest was strapped with adhesive and the patient was admitted to hospital on same day, temperature and pulse being normal. On the following day (October 31st) the temperature and pulse rate were elevated (T. 101°; P. 110), and cough was noted for the first time. The patient complained of severe pain in the lower chest and lumbar region and this was translated in terms of the initial injury. He received a hypodermic injection of morphia, gr. ⅙, twice on this day. Towards night he became more restless. His respiration was slightly embarrassed and he was slightly cyanosed; the pulse was rapid and irregular. On physical examination, numerous moist rales were heard over the right lung posteriorly. No cardiac displacement was noted and the condition was considered to be pneumonic. During the next two days all his symptoms became intensified and he was obviously seriously ill. On November 2nd (three days after his accident), radiographic examination of the chest showed a massive collapse of the right lung. The strapping which had been applied to the chest was removed, and the patient was turned on his left (the sound) side. Within twenty minutes he stated that he was more comfortable and within one hour was expectorating large amounts of frothy sputum. Radiographic examination of the chest on the day following (November 4th) showed practically complete re-inflation of the right lung. Within three days his temperature and pulse were normal, and he was discharged from hospital in a plaster jacket within two weeks of his injury.

The points of interest here are, a severe injury to the left chest and left lumbar region, pain relieved by morphia, followed by massive collapse of the right lung with marked cardiac and respiratory embarrassment. Postural treatment was almost immediately followed by spectacular subjective relief and re-inflation of the affected lung.

CASE 2

H. W. B., male, aged 62. On March 2nd, 1929, this patient had a radical cure for a right inguinal hernia. Morphia was given before and after this operation. The day following he developed a troublesome cough which was not relieved by the ordinary remedies; then followed a slight rise in temperature to 99°, of the pulse to 90, with some wheezing and dyspnœa. By the 8th (six days after operation) his temperature was 102.4° and his pulse 100. He now complained of pain in the chest and had rusty sputum. The condition was considered to be pneumonia. His condition showed little change during the next four weeks, and on March 31st a radiographic examination showed massive collapse of the right lung. Postural treatment was commenced and the patient felt more comfortable. Within three days his temperature was normal, but his pulse remained rapid and radiographic examination showed the condition of collapse to be more marked than on the first examination. On April 13th, bronchoscopic examination was done and much mucus was aspirated from the area of the bifurcation of the bronchi of the middle and lower lobes on the right side, but in spite of this no evidence of re-inflation was seen in the radiograph taken the following day. Gradually, however, after this he improved, and a radiograph taken on May 4th showed some clearing of the parenchyma of the right lung.

In this case four weeks elapsed between the onset of symptoms which probably marked the occurrence of the collapse and its recognition by a radiographic examination. It would seem reasonable to believe that in this time secondary changes of an inflammatory character developed so that neither postural treatment nor aspiration under bronchoscopic control were followed by rapid re-inflation.

In both cases morphia had been administered and may have been a causative factor in suppressing the cough reflex.

We believe that in cases recognized early, if postural treatment is not followed within twelve hours by radiographic evidence of re-inflation, a bronchoscopic examination should be done.

We have had no experience with the method of treatment outlined by Hableston[4]. He believes that in massive collapse the negative intra-pleural pressure is increased. In his hands partial artificial pneumothorax reducing the negative pressure within normal limits has given immediate relief to the dyspnœa and cyanosis.

The post-operative patient who is so unfortunate as to develop signs suggestive of a respiratory complication is entitled to as careful an examination as he received for his original condition. A diagnosis of pneumonia based on clinical findings is not sufficient. He is entitled to a bedside radiographic examination also. The complication may prove to be a pneumonia, but it may also be an abscess of the lung, a pericarditis, or a massive collapse. Bedside radiography in acute medical cases and in post-operative cases where the convalescence is not continuously progressive may be much more than instructive from the point of view of a diagnosis. It may direct the application of therapeutic measures which may materially shorten convalescence or even prove life-saving.

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THE DIAGNOSIS OF RENAL GLYCOSURIA*

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THIS paper was prompted by the fact that within the last twelve months three diabetics were admitted to this hospital with the disease fairly well advanced and, in each case, a diagnosis of renal glycosuria had been made less than two years previously. One of these patients now requires forty units of insulin a day in order to keep the disease under ideal control. This patient will be referred to again, as the diagnosis in his case was based upon the results of a blood sugar time curve and, incidentally, was made in a hospital.

Since renal glycosuria in no way, except for the glycosuria, resembles diabetes, it is rather difficult, on the basis of probabilities, to assume that all these individuals developed diabetes only recently. However, one of the essentials for the diagnosis of renal glycosuria is that the individual so affected must not subsequently develop diabetes. The purpose of this paper is, therefore, to outline the essentials for the diagnosis of this condition and demonstrate its main features by the report of a case met with recently. From this outline, it will appear that the diagnosis is rather complicated, demands hospital management, a knowledge of elaborate laboratory technique, and can hardly be made in office practice. This is exactly the idea the writer intends to convey. In office practice, the safest procedure is to assume that glycosuria indicates diabetes until proved otherwise. Since, when compared with diabetes, the incidence of renal glycosuria is extremely low, it is suggested that it is a much safer plan to underfeed a normal individual temporarily than to overfeed a diabetic.

In a previous study of renal glycosuria in this hospital[1], a striking feature noted was the small number of authentic cases recorded in the literature. Since then, the literature has increased. In the experience of our diabetic clinic, the incidence still continues to be very low. This may be due to the operation of the laws of chance, and it is not suggested here that the diagnoses in the great majority of cases recorded were not correct. It may, however, be observed that on the basis of the available evidence only, that is, the recorded data, the diagnosis of renal glycosuria in a large number of these cases is not proved.

Renal glycosuria may be defined as a condition in which there is undue permeability of the kidneys to sugar, the concentration of sugar in the blood remaining within the normal limits. The quantity of sugar excreted is usually small, being unaffected, or not much increased, by carbohydrate-containing foods. There is a marked contrast between renal and true diabetes in that in the former the functions of mobilization, storage, and utilization of sugar are unimpaired. Unlike true diabetes, insulin does not influence the rate of the urinary excretion of sugar in the absence of marked hypoglycæmia. The condition is compatible with good health and long life, as symptoms of diabetes do not develop. Insurance companies, whose medical departments keep up with the advances of medicine, do not regard these individuals as "sub-standard" and accept them as policyholders at ordinary rates. The features of importance will now be dealt with separately:—

1.—There Must Be No Signs Nor Symptoms of Diabetes

This hardly requires further comment.

2.—There Should, Ideally, Be No Family History of Diabetes

Interpretation of this part of the history is, at times, difficult, since the incidence of a family history tends to be large, both in diabetes and renal glycosuria. As a matter of fact, the familial character of renal glycosuria is sufficiently marked to constitute a cardinal feature of the condition.

3.—The Figure For Blood Sugar Obtained In the Fasting State Must Always Be Normal

It might here be pointed out that a normal blood sugar obtained in the fasting state, even

*From the Department of Metabolism, The Montreal General Hospital, Montreal.

when found repeatedly, and when no alterations whatever have been made in the dietary habits of the individual, does not exclude diabetes. Mild diabetics, particularly of the chronic progressive type, when the glycosuria is still of a post-prandial character, may, over a period of months and even years, have normal blood sugars and urines free of sugar in the fasting state. It is only, as a rule, when the glycosuria is found persistently throughout the twenty-four hours that hyperglycæmia is found in the fasting state. With regard to blood sugar studies, a blood sugar time curve obtained following the ingestion of glucose may be the only indication of diabetes. Here, again, there are pitfalls in the interpretation of data. A few observations may be made at this point.

It is the exception rather than the rule, at least in the experience of the writer, when patients apply for such tests that they have not had their diet altered with regard to its sugar content for a number of days at least. The usual history is that glycosuria was discovered during a routine examination for insurance, etc. The individual then consulted his own physician who suggested a blood sugar time curve, but advised the patient to restrict carbohydrates, for purposes of safety, until the diagnosis was certain. Wise practice as this may be from a therapeutic point of view, the fact remains that it may mask true diabetes when the latter is in its very early stages. In very mild, though definite, diabetes, it is possible under these conditions to obtain a perfectly normal blood sugar curve. For this method of diagnosis, one must, therefore, make certain that the individual has not in any way altered his dietary habits for some days prior to the test.

Another, and not uncommon, error in the interpretation of blood sugar time curves is the assumption that if, during the period of observation, sugar is excreted when the blood sugar is below the usually accepted threshold level, namely, 0.18 per cent, the individual has renal glycosuria. As a matter of fact, the diagnosis in one of the three patients referred to, that is, in the one who now requires insulin (Hosp. No. 6037-29), appears to have been made chiefly on this basis. It is important to recognize that once hyperglycæmia and glycosuria are produced by the ingestion of glucose, sugar may continue to be excreted for some time in spite of the fact that the blood sugar is falling. Thus:—

	Blood sugar	*Urine sugar*
	Per cent	
Fasting Period	0.100	0
Given 100 grams of glucose:		
30 minutes after ingestion	0.250	+
60 " " "	0.153	+
120 " " "	0.111	trace
150 " " "	0.085	0

Note the presence of sugar in the urine when the blood sugar was falling and was only 0.153 per cent. Incomplete emptying of the bladder is excluded.

Another point to consider with regard to blood sugar time curves is that there is still disagreement as to the significance of certain results, though all workers are in agreement as to the constitution of a perfectly normal curve. The above curve is cited as an example. Here, we note a normal blood sugar before and after the test, but a marked hyperglycæmic response at the end of one-half hour. Some regard this curve as normal. As a matter of fact, some insurance companies request blood sugars before and two hours after glucose only. From the experience of this hospital, this curve is regarded as abnormal. We now have about three thousand blood sugar time curves correlated with the clinical conditions, and only in very few instances have we been unable to find some condition which may lead to disturbance of carbohydrate metabolism associated with it.

Assuming the above type of curve to be abnormal, another fact to consider is that it is possible to have marked and undetected hyperglycæmia. The usual practice is to obtain the blood sugar one-half hour after glucose ingestion. The blood sugar may, however, rise to a much higher level sometime before this period. This may then lead to sugar excretion and the conclusion from the *curve alone* would be that sugar is excreted without hyperglycæmia, or below the threshold level. On this basis, a diagnosis of renal glycosuria might be made. It is interesting, in this connection, to note that glucose is very rapidly absorbed from the gastro-intestinal tract. As a matter of fact, its oxidation may be detected as early as seven minutes after its ingestion[2].

There are a number of other factors which may influence blood sugar curves and it is suggested that one making use of this test for diagnosis should be familiar with them. They may be found in all standard works of physiology.

4.—There Must Be Little or No Relationship Between the Intake and Excretion of Sugar

This may be detected in two ways, namely, (a) by daily urinalysis over long periods of time while the individual is following his ordinary dietary habits, or (b) increasing the sugar content of the diet over a short period of time, while the patient is under hospital care. The results of such observations will be shown in the accompanying case report.

5.—The Rate of Utilization of Sugar Should Be Normal

This is determined by studying the respiratory metabolism. Again, as with blood sugar time curves, there are a number of variables to be considered in the interpretation of data. These have been repeatedly emphasized in standard works. The technical details of this test and the interpretation of the results are not only more difficult but more numerous than with blood sugar time curves. When, however, properly performed and properly interpreted, this method is a most valuable index of carbohydrate metabolism. It was, so far as the writer can ascertain, first employed in the study of renal glycosuria in this hospital. The results obtained have been corroborated by the use of a much more elaborate technique by Ladd and Richardson[3].

6.—The Individual Must Not Subsequently Develop Diabetes

Time is, therefore, an important factor in the diagnosis of this condition.

Report of Case

(No. 207/30.) A male, 48 years of age, was admitted to the surgical service of Dr. A. T. Bazin, on January 9th, 1930, with a fracture of the lower third of the tibia and fibula, due to a fall on the same day. During a routine examination, sugar was found in his urine and, according to the practice in this hospital, his case was immediately referred to the Metabolism Department for observation.

Family History irrelevant. There was no history of diabetes nor of glycosuria.

Personal History in regard to past illnesses also irrelevant, and in regard to the glycosuria the following is of interest:—

At eighteen years of age, the patient applied for and received a life assurance policy. He applied again at the age of twenty and twenty-two years and was accepted on both occasions. At twenty-seven years of age, he again applied and, for the first time, sugar was discovered in his urine. He was then given a diet by his physician and, though adhering to it strictly, sugar was repeatedly found in the urine. As he did not feel ill, in spite of the persistent glycosuria, he broke diet and during the last twenty years has not restricted his diet in any way and, except for his recent accident, has always felt well.

Except for the local condition, the physical findings were entirely negative. There were no signs, subjective or objective, except for the sugar in his urine, to suggest diabetes. The maximum, average, and present weights are about the same. The laboratory findings, except those of the study of his carbohydrate metabolism, were as follows:—

Urine:

Clear; specific gravity 1012; no albumin; sugar, present; no acetone nor diacetic acid; microscopically, negative.

Blood:

Red cells	4,800,000 per c.mm.
White cells	8,200
Hæmoglobin	83 per cent (van Slyke)
Wassermann Test	negative
Sugar	0.111 per cent
van den Bergh Test	negative

Kidney Function:

Urea nitrogen	0.18 mgm. per 100 c.c.
Creatinine	1.43 mgm. per 100 c.c.
Uric acid	2.66 mgm. per 100 c.c.
Plasma chlorides	0.590 per cent
Urine urea concentration following the ingestion of 15 grams of urea,	
1st hour	2.64 per cent
2nd hour	2.61 per cent

	Urea	
	Given	*Not given*
Urea concentration factor	39	69
Urea secretion constant (van Slyke)	6.4	11.0
Blood urea clearance (van Slyke)	42.9	78.0

X-Ray (routine in all of our diabetics):—

Feet	No evidence of arteriosclerosis
Chest	No evidence of tuberculosis

Since, the blood sugar was normal, in the fasting state, a blood sugar time curve was obtained on the following day with these results:—

Period	*Blood sugar*	*Urine*
	Per cent	
Fasting	0.111	+
Given 100 grams of glucose:		
30 minutes after ingestion	0.166	+
60 " " "	0.137	+
120 " " "	0.114	+
150 " " "	0.087	+

The points to be noted are (a) glycosuria, in the fasting state, in spite of the normal blood sugar; (b) a maximum sugar of 0.166 per cent; (c) a return of the blood sugar to the normal level at the end of two hours; and (d) persistent glycosuria throughout the test, regardless of the blood sugars.

In view of the above findings, it was desired to make certain of good storage of carbohydrates before attempting further studies, particularly with regard to the respiratory metabolism. Incidentally, by increasing the amounts of carbohydrate, one could observe the relationship between the intake and excretion of sugar. The following were the results:—

Date	COH.	Fat	Prot.	Total available glucose	Urine Volume	Urine Specific gravity	Blood sugar
15	250	117	63	300	600	6.0	0.098
16	347	117	68	400	850	10.2	0.100
17	448	121	65	500	1200	18.0	0.131
18	550	93	64	600	650	10.4	0.122
19	550	93	64	600	900	9.0	0.120
20	550	93	64	600	500	6.0	0.113
21	550	93	64	600	450	3.3	0.116

The following are to be noted:—

(a) absence of polyuria;

(b) the daily amounts of sugar excreted were small and not influenced by sugar intake;

(c) an intake of as much as 600 grams of available glucose. The patient felt uncomfortable with this amount of sugar since, as he stated, it was much greater than he was ordinarily accustomed to;

(d) normal blood sugars daily, except for a slight disturbance on one day, at which time there was a slight fever. However, it will again be noted that it was not related to the maximum food intake and was not found again.

As the patient by now had been on a heavy carbohydrate diet for four days, respiratory studies were made. The combined data are shown in the following table. The technique employed was the same as that employed previously[1], except that the protein metabolism was not assumed to be fifteen per cent of the total heat production. He voided urine before and three hours after the test.

The following are to be noted:—

1. A rise in the respiratory quotient almost to unity and maintained at a high level.

2. A normal increase in the heat production above the basal level, *i.e.*, a normal specific dynamic response.

3. A normal rate of oxidation of sugar.

4. A low rate of excretion of sugar; during the entire period of observation there was only 2.83 grams.

5. Again, it will be noted there was no polyuria.

SUMMARY

To summarize, we have here an individual in whom:

1. Sugar was accidentally discovered in the urine.

2. There were no signs nor symptoms to suggest diabetes at the time of the discovery of the sugar.

3. There was no family history of diabetes.

4. The daily blood sugars were normal, in the fasting state, though sugar was persistently found in the urine during these periods.

5. The blood sugar time curve obtained after glucose ingestion was normal, except for the glycosuria.

6. Daily observation with increasing quantities of carbohydrate food showed that there was no relationship between the amount of sugar ingested and excreted. The amount excreted was small.

7. There was no polyuria.

8. The respiratory metabolism was normal and, lastly,

9. After twenty years of glycosuria, with no alteration whatever in his dietary habits, the patient did not develop any signs nor symptoms of diabetes. The diagnosis of renal glycosuria is, therefore, made in this case. This, it may be

RESPIRATORY METABOLISM

Period	Per hour: Litres	Litres	Urine-N grm.	Resp. Quotient: Total	Non-protein	Calories per hour: Total	Increase above basal %	Calories per hour from: COH.	Fat	Prot.	Grams food oxidized per hour: COH.	Fat	Prot.	URINE: Volume c.c.	Sugar: Per cent	grm.
Before glucose	13.140	9.581	0.344	0.727	0.720	61.34		2.51	49.72	9.12	0.63	5.47	2.22	40		
30 min. later	14.330	11.156	0.430*	0.778	0.778	67.70	10.3	14.19	42.12	11.40	3.55	4.63	2.78			
60 min. later	13.370	12.440	0.430*	0.930	0.959	65.51	6.7	46.67	7.35	11.40	11.67	0.81	2.78			
120 min. later	13.870	12.480	0.430*	0.901	0.920	67.46	10.1	40.83	15.25	11.37	10.21	1.68	2.77			
180 min. later	13.360	11.140	0.430*	0.834	0.834	63.87	4.1	23.94	28.56	11.37	5.98	3.14	2.77	156	1.80	2.83†

*Average per hour obtained from 3 hour sample.
†Total excretion during 3 hours following glucose.

stated, is our routine in every case before such diagnosis is made. It is obvious that this procedure is hardly possible in office practice. The purpose of recording all of the data in detail is to emphasize that it is unwise to make a diagnosis of renal glycosuria in office practice. As stated above, the condition is very uncommon. It is, therefore, safer to underfeed a normal individual than to overfeed a diabetic. The patient referred to above who now requires insulin emphasizes the fact that an individual with glycosuria should be regarded as a diabetic until proved otherwise.

The writer is indebted to Dr. A. T. Bazin for his kind co-operation in allowing the patient to overstay the time necessary for the relief of his surgical condition, and, thus, to occupy a bed which could have been used to greater advantage in a surgical service.

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THE RELATIONSHIP BETWEEN THE CLINICAL AND PATHOLOGICAL FINDINGS IN PRIMARY PULMONARY MALIGNANCY*

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MEDICAL text books dealing with the subject of primary malignancy of the lung give as the typical symptoms, pain, cough, hæmoptysis, certain typical sputa, dyspnœa, and loss of weight, but no account is given as to how and in what order these arise and progress. Now this symptom complex is rather that of disease of the lungs than of any particular disease and is not very enlightening. Brunn[1], in an excellent analysis of the published records of six hundred and twenty-nine cases, analyses the incidence of the main symptoms reported, as follows:—

	Per Cent
Cough	65
Sputum	75
Bloody Sputum	40
Pain	60
Dyspnœa	50
Loss of Weight	35
Fever	45
Effusion, early	15
Effusion, late	45
Metastases	85

He does not, however, attempt to correlate the times of onset with any particular stage of the disease.

Standard literature on the subject of the x-ray diagnosis gives descriptions of several types of malignancy—infiltrating, hilar, nodular, lobar, and the varied appearances produced by these are discussed. But, again, one cannot gather a very clear impression as to the pathognomonic or characteristic appearances differentiating this disease, especially in its early stages, from other pulmonary diseases.

It is my desire in this paper to point out that the symptoms arise in a definite sequence, depending on the actual underlying pathological condition, that this is demonstrable in the living by x-ray, and that the symptoms or symptom-complex of any stage are more or less constant for that stage. A conception such as this, while not infallible, gives one a much clearer picture of the disease.

Some of the indefiniteness arises from the fact that sarcoma of the mediastinum, which early involves the lungs, and metastatic malignancy, which is considerably more common than primary growths, are apt to be confused, although they are distinctly separate entities with different clinical pictures. Confusion occurs, too, from the prejudice that malignancy of the lung is a chronic disease, producing only one of several varied clinical conditions and roentgenographic appearances. This mistaken idea has given the more trouble because the most rapidly growing of all lung carcinomata, the so-called "oat-celled" carcinoma has not been considered, but has been frequently inaccurately classified as a sarcoma[2]. Actually, however, carcinoma of the lung is a rapidly progressive disease. According to Hunt[3], the average duration of the disease is six and one half months, while death occurs often within a few months of the first consultation with a physician. During this brief period the pathological processes show a number of changes

*A paper read at the Sixtieth Annual Meeting of the Canadian Medical Association, Section of Radiology and Physiotherapy, June 20, 1929.

in rapid sequence and with these are associated a changing radiological and clinical picture.

Pathologists classify carcinoma of the lung as either bronchogenetic (including the mucous-secreting glands of the bronchus) or alveolar in origin, depending on the supposed histological focus of origin. This classification is not correlated in any way with the clinical results of the disease. In a previous paper[4] by Dr. Kirklin and the present writer, reporting sixty-three cases from The Mayo Clinic, it was found that a grouping into bronchial and parenchymal, on the basis of macroscopic rather than microscopic findings, had a more serviceable application. Microscopically, any kind of tumour, from definitely squamous to definite adenocarcinoma, can be found in either situation, although the squamous form is commoner in the bronchus. The tendency is, however, to the formation of undifferentiated tumours of a high grade of malignancy. The "bronchial" tumours are those which commence in a bronchus of such size that the effects of the growth are produced through interference with the bronchus; they produce effects both locally and in the zone of lung normally supplied by the affected bronchus. This might usefully be defined as a bronchus of such a calibre that it could be visualized by expert bronchoscopy. In actual practice, bronchoscopy has become the method of diagnosis *par excellence* for this type of growth. It is probably impossible to overstress its value, and where available it should be employed as a routine in all cases of over thirty-five years of age in which there is any suspicion of bronchial tumour. In expert hands it is both simple and safe. Parenchymal tumours on the other hand are those arising in the substance of the lung, and whether derived from the alveolar epithelium or from the lesser bronchi is clinically immaterial. These are the only two possible foci of origin of true primary lung malignancy. As with all related lesions they have a common overlapping ground but in the early stages are quite distinct.

Bronchial growths produce their effects first by affecting the bronchus. Growing as they do within the lumen of the bronchus, these growths are not at first visualized in a roentgenogram. Some of them remain frankly intrabronchial; the majority ultimately erode through the bronchial wall; even of these latter a number are in first degree bronchi and are actually therefore intramediastinal. Thus, only in a proportion of cases does the x-ray show evidence of a mass growing in the hilus; however, when it does occur it will always be unilateral, and of an infiltrating nature. There are only a few other diseases which produce unilateral hilus shadows. These are all diseases which cause localized adenopathies, such as tuberculosis, the lymphomata, and glandular metastases. These all produce a mass with a smoother contour and more definitely circumscribed edge. Moreover, they can often be differentiated by other means; for instance, the lymphomata are radio-sensitive and disappear under the "therapeutic test" of radiation. More commonly the growth is chiefly intraluminal and tends to occlude the bronchus, thereby cutting off the air supply to the lung beyond and producing a condition of slowly increasing atelectasis. Roentgenologically, this is easily picked up, and is characteristic, showing a smooth comparatively homogeneous density, either of a lobe or of the whole of the lung, at least one sharply defined edge, compensatory emphysema of the remainder of the lung, mediastinal and heart displacement towards the side of the atelectasis, and, relative to the other side, a degree of rib collapse. The association of such rib collapse and emphysema in the same lung is pathognomonic of atelectasis of one lobe of that lung. Except for foreign body inflammation there are, other than carcinoma of the bronchus, few conditions producing atelectasis slowly. Obstruction by a foreign body with acute massive or lobar collapse is a sudden process. Atelectasis is thus a very important sign of early bronchial malignancy. The appearance produced by atelectasis is mistaken chiefly for one of the varied forms of pneumonitis or pneumonic abscess. The homogeneity, the absence of irregularity in the consolidated portion, and the defined, yet not thickened, edge, help to distinguish it from these conditions. Displacement of the heart, of the trachea, and of the ribs serve to distinguish it from lobar pneumonia.

Certain of the German[5] writers and a few American have added to the accuracy of diagnosis of the intrabronchial growths by showing that sometimes they can be visualized by lipiodol injections, which will either produce an actual "filling defect" of the bronchial outline or will show lipiodol held up at the site of an obstruction.

So, too, the first symptoms of this growth are produced by its irritant action within the bronchus. The history given by these cases is always that of the onset of a persistent, troublesome cough. At first this cough is unproductive, but sooner or later, depending on the type of

growth (papillomatous or ulcerative), it becomes associated with some kind of hæmoptysis, either a constantly blood tinged sputum or a series of frank minor hæmoptyses. It seems that the only circumstance in which this cough disappears is when the obstruction of the lumen and the resultant local atelectasis becomes so complete that there is no air passage whatever over the growth, *i.e.*, when the bronchus is thrown completely out of action. Atelectasis itself, until advanced, is symptomless, but can be picked up by carefully interpreted physical examination, when the heart displacement, limitation of movement and lessened capacity of one side is appreciated. As long as the lesion remains localized to a bronchus this "cough-blood" syndrome is the sole symptom, evidence of atelectasis the only physical sign.

Much more rarely, partial obstruction allows stasis and infection to occur in the portion of lung peripheral to the lesion and bronchiectasis results. This bronchiectasis shows in the roentgenogram as the mottled areas of infiltration in the base typical of this condition, and results in a great increase of sputum production and some fever, with its associated leukocytosis. This effect is comparatively rare in the earlier stages of the disease (only one case in twenty). Both clinically and roentgenologically only bronchiectasis is diagnosed; the underlying malignancy should be discovered by looking for a cause. The diagnosis of bronchiectasis must always be considered as incomplete until a cause has been found for it, either in the history or by looking down the bronchus.

The other primary focus is within the actual lung substance, possibly from the wall of a minor bronchus, but never involving a major bronchus. Except when they lie behind the heart, these growths are easily demonstrated in the roentgenogram as an irregular nodular mass in the lung fields. This nodule tends to be circular, but may be quite irregular. It is dense throughout and lacks the sharp edge typical of metastatic nodules, being of an infiltrating nature, with irregular strands radiating out into the pulmonary substance. It is always single in this stage, a point which helps to distinguish it from multiple areas of infiltration of tuberculosis or of inflammatory processes, the two most easily confused lesions. Until it involves a bronchus or the pleura, the mass will continue to grow in size irregularly from its centre and may attain to almost any size, as an irregular mass, but it will remain as a single mass. As a rare complication it is said that this may necrose in the centre and form a so-called "malignant abscess"; usually, however, the abscesses found in association with malignancy of the lung are produced by infection distal to the malignant lesion and are true inflammatory abscesses secondary to the carcinoma.

Although the lung is essentially insensitive tissue, this type of growth is often associated with a peculiar form of pain, vague, difficult to localize, and feeling "deep in the chest". It has been described by Hunt[3] as follows: "In five cases the pain preceded any other disturbance by many weeks and was of a dull aching character, spreading to the shoulder blade of the affected side and sometimes even down the arm. This is unlike tuberculosis and easily mistaken for fibrositis or neuralgia". It is never acute or sharp, but, on the other hand if present, is extremely constant. It is obviously a "referred" pain and may be evidence of involvement of the visceral pleura. It differs, however, in character from the pain that goes with frank pleural involvement. This deep pain is the only symptom, at this stage, but is not as constant a finding as the cough-blood syndrome of the bronchial lesion, so that sometimes there is no clinical evidence whatever of the intrapulmonary mass. The presence of such nodule or mass is seldom demonstrable by physical examination.

The disease does not long remain of this local type. Sometimes as it grows the parenchymal lesion will involve a bronchus and produce cough, and later, bleeding, as with lesions primarily bronchial. McCrae[5], in his article on primary bronchial tumours, states that these constitute 85 to 90 per cent of all primary lung tumours. It is possible that he gets this impression from a study of autopsy cases, by failing to realize the frequency with which the disease commences in the parenchyma, but early invades a bronchus from without. In such cases, as a rule, the initial complaint is of pain, cough and evidence of bronchial irritation occurring later. At this stage, too, bronchial occlusion may add atelectasis to the picture and so produce a composite result —the original mass plus the atelectatic area giving the appearance formerly known as the lobar type of cancer of the lung.

The next most frequent complication is involvement of the pleura. This occurs either as a direct invasion or as a transudation resulting from obstruction of root lymphatics. This incidence of pleural effusion occurs relatively early

in the course of the disease and may be the first evidence of trouble. Yet its onset makes a marked change in the clinical picture. Its demonstration radiologically is simple. At first, there is a complete density of the base of the lung field, concealing the diaphragm and showing an upper margin which curves upwards from within out (Damoiseau's line). The lung field is later blotted out by the fluid, with displacement of the heart and mediastinum to the opposite side. This entirely masks the atelectasis or the carcinomatous masses. It is equally easily demonstrated by physical signs. "An otherwise unexplained effusion in an elderly patient should always excite suspicion"[6].

With this pleurisy there is associated a change in the type of pain, which becomes more tangible, more distressing, and more superficial (the typical pain of lesions of the parietal pleura). As the fluid increases in amount we get the first onset of dyspnœa. It is noticeable that although there is sometimes some dyspnœa, especially on exertion, associated with minor degrees of atelectasis or with a pulmonary mass, yet dyspnœa does not become an important symptom until after the occurrence of pleural effusion. In the study of The Mayo Clinic group of cases mentioned[4], the close relationship between dyspnœa and accumulated pleural fluid was striking. The fluid itself is usually non-purulent, but often blood-stained and re-accumulates extremely rapidly after tapping; thus any radiography undertaken to show the underlying pathological basis must be done literally within a few hours of the tapping. Advanced atelectasis or massive growth may cause dyspnœa, in the absence of fluid, but only when it is of such an extent as to actually leave an insufficiency of functioning lung tissue.

As with malignant processes in all parts of the body there is a liability to complication by secondary infection; the result of this will be the addition of the general symptoms of fever and toxæmia to any previously present symptoms. This complication is comparatively rare. It is evidenced by a low grade irregular temperature, leucocytosis, and by general lassitude, weakness and weariness, giving that intangible type of "illness" associated with chronic infective processes. Pathologically, there is, as previously noted, either a true bronchiectasis or a generalized infection of the whole area round the malignant growth, with pneumonitis, empyema, abscess-formation and so on; these all produce the x-ray appearances characteristic to themselves and not those peculiar to malignancy.

At the same time, as it is extending to the pleura, or as an alternative to such extension, there are other methods of extension of the growth. These are all, in some way or other, extensions by metastases. It may metastasize locally by the occurrence of growths distal to the main growth, and produce a picture only differentiated from metastases from other foci by the presence of the single large primary growth. This appearance, "a large growth with satellites", is the one described by Carman[7] as pathognomonic of malignancy of the lung. More often, however, the metastatic spread is inwards along the lymphatic stream to the mediastinum and thence to the neck. This will produce roentgenologically the appearance of multiple rounded masses protruding from and altering the contour of the mediastinum, an appearance more typical of the lymphoblastomata.

Clinically, metastasis is not a frequent cause of symptoms. The process results in the occurrence of palpable glands in Virchow's angle and symptoms of pressure within the mediastinum on the trachea or œsophagus. It is peculiar that in parenchymal carcinoma the occurrence of palpable but painless metastasis in the glands of the neck is so extremely common. Or the process may erode some of the vascular channels of the lungs and metastasize to distant points. The lung is such an extremely vascular organ that this occurs quite early and again may actually be the first evidence of trouble, cerebral or bone metastasis being commonest. The diagnosis first made is that of brain tumour or indeterminate bone lesion; the lesion in the lung is only discovered later by routine radiography of the chest.

The conditions which in the end bring about the fatal outcome are cachexia, massive extension, unrelieved pleural effusions, or advanced infective complications. The high grade of the malignancy, the rapidity of the process, and the present difficulty of operative procedures in the lung make the lesion, even when diagnosed, somewhat difficult to treat. Yet some attempts have been made in early cases. Pneumectomy has been successful in Sauerbruck's hands[8] in two cases with three and five years' survivals, respectively, and in Brunns' hands in one case with eight months survival. The mortality is extremely high and few attempts have been reported. The possibility of cure of the bronchial

type by radon seed implantation has always been tempting, but seldom successful. Jackson[9] in 1917, Orton[10] in 1925, and Green[11] in 1925, reported cases in which bronchial tumours were successfully so implanted, but from the description, these were probably almost benign types of growth. Recently Kernan and Cracoveiner[12] have reported a case of true bronchial malignancy in which a cure was obtained by combined intrabronchial diathermy and radium, the patient still being alive fifteen months later.

X-ray treatment, although it gives spectacular palliative relief at first (as shown by the present writer in a previously published study[13] of nineteen treated cases), does not affect the end result and does not materially lengthen life.

SUMMARY

A relationship exists with some degree of constancy between the x-ray findings in primary malignancy of the lung and the clinical symptoms produced by that disease. The initial lesion occurs either in an actual bronchus, producing atelectasis and a persistent cough with blood-streaked sputum, or starts in the parenchyma as a nodule visible radiologically and associated with a deep-seated pain. With growth, bronchiectasis or infection developes with sputum production and fever, or pleural effusions occur with dyspnœa and an alteration in the character of the pain. Advanced atelectasis or massive growth may also cause dyspnœa which is then due to actual insufficiency of functioning lung tissue. Metastases occur early and may be of any nature, producing symptoms depending on location.

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THE HOSPITAL SITUATION IN ENGLAND*

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I FEAR that it will be difficult in a relatively short time to give an adequate picture of the hospital situation in England at the present time. I shall endeavour to indicate some of the great changes now under way as the result of the Local Government Act 1929.

My information has been secured from Sir George Newman, Chief Medical Officer of the Ministry of Health in conversation and through his published reports, from members of his staff, from an address given the Canadian Tuberculosis Association officers at Alton by Dr. F. K. N. Menzies, Medical Officer of the London County Council, and from the files of the *British Medical Journal.* I trust that my attempt at condensation will not result in misconstruction.

The nucleus of the change in the hospital situation can be set out in the bare statement that on April 1, 1930, the Poor Law Infirmaries, representing not less than 120,000 beds, will become municipal hospitals under the direction of the department of health of the County and County Borough Councils, and indirectly under the Ministry of Health. In London, the London County Council will become responsible for all Poor Law Medical Services as well as those now performed by the Metropolitan Asylums Board, which will cease to exist. Thus, throughout England and Wales, all the hospitals, other than voluntary, will be under a unified control by a body which will have the power of imposing a rate for their development and maintenance.

The relief of destitution by the provision of food, clothing and lodging has been the care of the Poor Law since the reign of Elizabeth. Out of the movement which led up to the Reform

* Read at the Convention of the Ontario Hospital Association, Toronto, October 18, 1929.

Act of 1832 grew the reform of the Poor Law in 1835 and in the subsequent year the reform of the municipalities. The Poor Law districts were enlarged, the Guardians were appointed, and a central Poor Law Board established to whom the Guardians were directly responsible. The rapid growth of industrialism created sanitary problems for the densely populated ill designed towns. In 1845 came the Health of Towns Bill, followed by the Public Health Act of 1848 with its central Board of Health. This Act established the Public Health Service by providing a code, a local sanitary authority, and a central board. In the meantime the Boards of Guardians had been made rural sanitary authorities and the Vaccination Act gave them a place in preventive medicine. Thus, with the care of (1) the poor in health and in illness; (2) the aged and infirm; (3) mental patients; (4) maternity cases; (5) convalescents; (6) medical out-patient relief; and (7) vaccination, the Guardians have had many medical and semi-medical functions. Their bed accommodation has amounted to about 37,500 in infirmaries and some 84,000 in workhouses, many of the latter having well designed hospital wards.

A Royal Commission on the Poor Laws presented reports for the period 1905 to 1909 which have been widely discussed. These were formulated into legislation in the Local Government Act of 1929 which has attempted to mitigate the confusion, and lessen the cost of administration entailed by the dual and overlapping medical functions of the Poor Law Authorities and the local Public Health Authority.

The Act provides for the absorption of the Poor Law Medical Service within the Public Health Service, and it makes the Local Authorities (county and county borough councils) responsible for (a) vaccination; (b) infant life protection; (c) the collection of the fundamental vital statistics; and (d) severally or jointly for the provision, maintenance, and management of all public institutions for the amelioration or healing of physical and mental disease. Thus, many thousands of beds for sick or mentally infirm patients in separate infirmaries and other institutions will pass from the Guardians to the Local Authorities, (municipal councils or their health departments), who in this way become the sole authorities for all the public medical services provided under statute and available for the public use. Definite provision is made to secure to every County District Council at the earliest possible moment the services of a Medical Officer of Health, whose attention will be concentrated upon public duties only. The Act leads directly to a more or less complete unification of the public health service, environmental and personal.

The Ministry of Health has asked the Local Authorities and their medical officers to submit to the Ministry a plan or scheme for the most practical method of approaching the problem of co-ordination in their respective districts. These were to be in the hands of the Ministry of Health by September 29th for approval or consideration. Each of the 62 administrative counties and the 83 County Boroughs is asked to work out its own plan, which must provide for its medical and surgical needs, institutional and administrative. The medical and semi-medical functions of the Boards of Guardians, and the corresponding functions of the County and County Borough Councils, which are to be fused, have been thus outlined by Sir George Newman in his report just published.

MEDICAL AND SEMI-MEDICAL FUNCTIONS OF BOARDS OF GUARDIANS

A. Provision and management of institutions for:
   1. Patients needing continuous medical or surgical treatment (Hospital patients):
      (a) suitable for general wards;
      (b) requiring special wards, *e.g.*, delirious, venereal, tuberculous and other infectious patients;
      (c) requiring specialized treatment, *e.g.*, orthopædic, ophthalmic, aural, laryngological, dermatological, and other patients.
   2. Maternity patients and newly-born infants: normal—complicated—septic—venereal.
   3. Non-mental patients needing institutional treatment because they are suffering from some chronic disease; also for aged, infirm persons whose medical and nursing needs approximate to those of chronic patients. (Infirmary patients).
   4. Mental patients:
      (a) Defectives from an early age and
      Epileptics: children trainable.
      adults otherwise.
      (b) Other mental patients:
      Admitted for observation; harmless lunatics; senile dements.
   5. Healthy infants (0-3) (excluding those still in the maternity wards) (Nursing infants).
   6. Healthy children (3-16).
   7. Convalescents in special homes.
   8. Adults in health, and others not in need of medical supervision, *i.e.*:
      The aged; cripples, not bed-ridden; casuals; others.
B. Medical out-relief.
C. Vaccination.

D. Supervision of boarded-out infants and children under the Children's Act and otherwise.

For the discharge of some of these functions medical advice is needed only occasionally, *e.g.*, for the medical examination of casuals and for the classification and occasional treatment of the aged and of cripples.

CORRESPONDING FUNCTIONS OF COUNTY AND COUNTY BOROUGH COUNCILS

(The letters and numbers on the left hand side refer to corresponding functions of Boards of Guardians.)

A, 1, 2, 3: Provision of fever hospitals.
A: Provision of dispensaries, hospitals and sanatoria for tuberculosis.*
1: Provision of maternity and infants' hospitals.
2: Provision of orthopædic treatment.
3: Provision of schools for physically defective children.
Provision of treatment for venereal diseases.*
Supervision of midwives.

A, 4: Provision of schools for feeble-minded.
A: Provision of M.D. institutions.*
4: Provision of mental hospitals.*

A. 5, D: Care of children under school age.
A. 6, D: Medical inspection and treatment of school children.
A. 8: Provision for the blind.*
C. Control of infectious diseases.

This gives some idea of the institutional problems alone which are involved in the Local Government Act of 1929.

Sir George's remarks on the ideal size of a hospital may be of interest:—

A self-contained general hospital should be of a certain minimum size if it is to make provision for all the medical and surgical demands which may be made upon it, and must serve a considerable population if it is to justify the appointment of a skilled staff. Probably 300 beds should be regarded as a minimum, if special provision is to be made for sick children, maternity and gynæcological patients, mental patients admitted for observation, and departments staffed for x-ray work and for the treatment of ophthalmic, aural, laryngological, and other diseases. On the one hand, however, 300 is too small to form an economic unit, and on the other hand it is much in excess of the present requirements of the smallest counties and county boroughs, which would also find difficulty in equipping all the special departments or in keeping them employed. The advantages of providing hospitals of large size, and of placing them in or near large centres of population, suggest the desirability of adjacent authorities entering into agreements for the joint use of hospitals.

In the larger urban centres about 3 per 1,000 are found in the sick wards of the Poor Law Infirmaries and institutions. In London in 1927 the figures were 31 per 10,000, the numbers varying in the different boroughs from 46 to 17. Last year, 12,834 street accidents were taken to these institutions by London County Council ambulances and 21,433 to the voluntary hospitals.

* Those functions marked with * are also entrusted to County Councils and the others to County Councils in all or in certain parts of their counties.

Apparently no definite regulations have been laid down as to the medical staff and the method of their appointment. This will devolve upon the Local Authority advised by the Medical Officer. During the past year a series of conferences have been held between representatives of the British Medical Association and the Local Authorities, to discuss salaries of whole time medical officers in the public health service. In a memorandum agreed to at a conference held at the Ministry of Health, and subsequently adopted by the British Medical Association, resident medical officers were to receive £350, with annual increment of £25 up to £450 per annum, with board, lodging, laundry and attendance. Medical superintendents of institutions other than medical hospitals are to have a salary on a scale as follows:

No. of beds in institution	*Minimum commencing salary*
Not exceeding 150	£750
151–200	800
201–300	850
301–400	900
401–500	950
501–600	1,000
601–750	1,050
Exceeding 750	1,100

(All salaries in this class are inclusive of the value of emoluments, for example, housing accommodation and board.)

In particular, the changes brought about by the Act in the relations between national and local finance, and in the scope and character of the powers of the Local Authorities to establish and maintain what may be called, with sufficient accuracy, general hospitals, have given rise to a careful and sometimes anxious scrutiny of the probable results of those changes in their bearing upon the position in future of certain voluntary associations devoted to the promotion of public health services and of the voluntary hospitals.

With a view to securing the support of Local Authorities for the voluntary associations concerned, and in order to initiate a regular process of consultation between Local Authorities and local bodies representative of voluntary hospitals, the following provisions are included in the Act.

SUPPORT OF THE WORK OF VOLUNTARY ASSOCIATIONS BY LOCAL AUTHORITIES

Part of the grants now paid on a percentage basis, which are to be discontinued on the introduction of the new consolidated grant, is at present paid to voluntary associations, and it has therefore been necessary to provide for the continued recognition and

encouragement of the valuable work done by these bodies at the hands of the Local Authorities amongst whom the grant will be distributed. The Act accordingly requires annual contributions from Local Authorities in respect of public health services rendered by voluntary associations to be secured:

1. To associations providing maternity and child welfare services, by means of schemes submitted to the Minister at least six months before the end of each fixed grant period, under which:

(a) The position of associations rendering services approved by the Minister immediately before the 1st April, 1930, will be safeguarded;

(b) Room will be left for new or increased contributions to associations which take up or extend work after the scheme is settled; and

(c) A proper sharing of contributions will be arranged between the County Council and any County District Councils who are Maternity and Child Welfare Authorities.

2. To Associations providing these services in London, by means of a scheme made by the Minister, after consultation with the London County Council, the City Corporation, and the Metropolitan Borough Councils, for the payment of contributions by those Councils.

3. To associations providing services for the welfare of the blind by means of a scheme made by the Minister for the payment of contributions by Local Authorities in whose areas the blind persons benefited reside.

4. To associations which undertake the duty of assisting or supervising mental defectives whilst not in institutions, by means of a scheme made by the Minister for the payment of contributions by Local Authorities.

5. To the Welsh National Memorial Association (the only voluntary body which now receives a direct grant from the Minister in respect of the treatment of tuberculosis), by means of a scheme made by the Minister for the payment of contributions by Local Authorities towards the cost of the service in connection with treatment of tuberculosis provided by the Association.

Room will also be left for the alteration of schemes under heads (2), (3), (4) and (5) so as to authorize new or increased contributions by Local Authorities on account of services undertaken or expanded by any of the associations during the currency of a fixed grant period.

Further, in order to relieve voluntary associations whose activities cover the whole, or numerous parts, of the country, from the difficulty of collecting contributions piecemeal from large numbers of Local Authorities, the Minister has power, both in relation to the schemes already described and otherwise, to pay contributions at the request of a Local Authority directly to any voluntary association having as its object the promotion of public health services to which the Authority are entitled, and desire to make them, and to deduct the amount so paid from the Council's share of the new consolidated grant.

In many of the areas where the Local Authority will be taking over Poor Law Hospitals and Infirmaries, there are well staffed and well equipped voluntary hospitals. These include the great teaching hospitals. Some of these hospitals fear that some of their financial support may be cut off when their subscribers feel the burden of extra rates demanded for the support of the Local Authority hospitals. To what extent the voluntary hospitals will suffer through loss of income, and through possible loss of staff to the Local Authority hospitals, only time can tell. The Ministry of Health has pointed out that it will be the business of the Medical Officer of Health to endeavour to secure effective medical co-operation between the Local Authority hospitals and the voluntary hospitals in his area, and to see that there is neither insufficient nor redundant accommodation. The Medical Officer of Health is further asked to facilitate medical research and education (undergraduate or post-graduate) in the hospitals under his charge, and to consider the provision of convalescent home accommodation to relieve the acute hospitals of recovery cases and so economize beds and service.

One section of the Act is designed to meet the need for close co-operation between the Local Authority and voluntary hospitals, to avoid unnecessary and wasteful competition. It is made necessary that local councils when making provision for hospital accommodation under the Act shall consult the governing bodies and medical staffs of the voluntary hospitals. Provision is made for the fullest consultation between the Local Authority and the medical profession in the area concerned.

TUBERCULOSIS HOSPITALS AND SANATORIUMS

In England and Wales these are carried on both by Local Authorities (municipalities) and by voluntary organizations. There are 473 dispensaries approved by the Ministry of Health and 73 other premises for out-patient care and treatment, in addition to the hospitals and sanatoriums for residential treatment. Substantial support for both capital and current expenditures is afforded those approved by the Ministry of Health. The number of sanatoriums and hospitals is thus tabulated in the last report of the Chief Medical Officer (see page 342).

Great Britain in framing its plan for the administrative control of tuberculosis adopted the scheme for the prevention and treatment of tuberculosis recommended by the Departmental Committe on Tuberculosis in 1912-13. This includes essentially two factors namely:

1. *The dispensary unit,* consisting of tuberculosis dispensaries with staff of officers and ex-

tensive and varied operations for the detection and prevention of tuberculosis.

2. *The institutional unit*, consisting of sanatoriums, hospitals, training colonies, open-air schools, etc.

The control of tuberculosis constitutes an important department of public health administration. It is now the duty of councils of counties and county boroughs (in Scotland, Local Authorities or combination thereof) to formulate tuberculosis schemes for their several areas. The schemes are submitted to the respective Ministry of Health or Board of Health (Scotland). With the ministry or board as the final health authority rests the responsibility of endorsement and formal approval. Such approval carries with it a contribution from the state of 50 per cent towards capital outlay and annual maintenance.

The work in each dispensary unit is controlled by the medical officer of health, who may in small counties or boroughs be the tuberculosis officer as well, or who may have in larger counties or boroughs one or many tuberculosis officers and assistants under his direction. They are principally whole-time officers, who may do only tuberculosis work, or perform combined duties as (a) tuberculosis officer and (b) school medical officer (or maternity and child welfare officer), and perhaps (c) medical officer of health of an urban or rural district council in the area. Those officers attend the dispensaries in the area and act as consultants to the general practitioner in carrying out home treatment, particularly in the case of the insured person. The Ministry of Health has advised that patients whose treatment does not call for experience or skill beyond that which general practitioners ordinarily possess, and who are either insured persons or who can afford to pay for medical attention, should not be encouraged to attend the dispensary for routine treatment. In the case of insured persons periodical reports are to be furnished to the tuberculosis officer by the general practitioner. It is expected, however, that every tuberculous person coming within the ambit of the dispensary should be entered in the register and kept under continued supervision (being seen by the tuberculosis officer at least once a year) until the patient (a) is considered cured, (b) has died, (c) has left the district, (d) has refused to continue under public medical treatment, or (e) has been lost sight of.

Sanatoria and Hospitals	*Institutions*		*Beds*	
	Local Authorities	*Voluntary*	*Local Authorities*	*Voluntary*
A.—Institutions for Pulmonary cases mainly or entirely:				
(1) Sanatoria (including Consumption Hospitals)	143	56	10,957	4,257
(2) Isolation Hospitals (including Smallpox Hospitals)	44	1	2,223	50
(3) Children's Institutions	12	11	631	807
B.—General Hospitals:				
(1) Town	1	145	44	538
(2) Country Branches	...	16	....	132
C.—Institutions for Non-Pulmonary cases mainly or entirely:				
(1) Adults only	3	6	242	211
(2) Children only	7	41	729	1,785
(3) Adults and Children	1	7	30	624
	211	283	14,856	8,404
	494		23,260*	

*The number of beds in 116 institutions (including 98 General Hospitals) is not available.

Nurses and health visitors are an important part of the dispensary staff: (a) to assist at the dispensary; (b) to visit the homes of notified cases, reporting on social and environmental conditions, and to follow up old patients; (c) to help in after care; and (d) at times to do actual nursing in the homes.

The six functions of the dispensary, as set out by the departmental committee, were:

1. Receiving house and centre of diagnosis.
2. Clearing house and centre of observation.
3. Centre for curative treatment.

4. Centre for examination of contacts.
5. Centre for "after-care".
6. Information bureau and educational centre.

The services available under the tuberculosis scheme are technically available for the whole community. Naturally, however, they are utilized mainly by the less well-to-do.

Under the government scheme many local authorities have prepared plans and built their own sanatoria and hospitals; others continue to use beds provided in voluntary institutions. Many counties and boroughs use both types of institution.

Up to the present the care of the tuberculous poor (pauper) has been in the hands of the Poor Law Guardians, though in a few areas the local authority have accepted general responsibility for all cases of tuberculosis. The advice of full-time tuberculosis officers has been available for patients under treatment by the Poor Law Guardians. Under the new Act the whole question of tuberculosis, including the care of those persons now under the Poor Law, will come under the tuberculosis scheme of the Local Authorities. It may be noted here that the Public Health Act of 1925 empowers compulsory removal to hospital of infectious cases of tuberculosis.

ARTIFICIAL LIGHT

It may interest some members to know that artificial light therapy is carried on quite extensively in England and Wales. Last year the Ministry of Health approved a further number of such centres. Treatment has to be carried on under medical supervision, and the medical officers and nurses must have special experience in this method of treatment.

At the end of 1928 there were:

1. Centres established by Local Authorities

At infant welfare centres	52
At tuberculosis dispensaries	24
At tuberculosis hospitals	14
At tuberculosis sanatoria	22
At other institutions	23
	135

2. Centres established by Voluntary Agencies and receiving patients

At infant welfare centres	19
At general hospitals (chiefly for children)	54
At tuberculosis sanatoria	8
At other institutions	13
	94

This special therapy is looked upon as an adjunct to other methods of treatment.

RADIUM

A National Radium Fund was opened last April, to raise £150,000. It has already reached about £190,000. To this the government is adding £100,000. The National Radium Trust is to hold the Fund and to purchase and hold radium for use by the National Radium Commission. The Commission deals with the distribution of the radium and will consider plans for the medical application of the radium and for research. The Commission as constituted has a majority of members representing skilled workers on the staffs of the voluntary hospitals. The radium supply will be placed by the Commission where it can be of greatest service. This national supply will go far to meet the needs of the hospitals at present unable to purchase their own.

PROPHYLAXIS OF INFLUENZA.—Dr. E. R. Lyth (Isle of Man) writes: Influenza has been my *bête noire* for many years and, in spite of inoculations and sprays, I have succumbed over and over and over again. Comparatively recently I hit upon the idea of spraying or atomizing my nose and throat with an infusion of tea, and I have found this most helpful; though attending cases of influenza, it has been a new experience to escape and to keep well. There is no pain whatever in the use of the spray, and the tea mixes readily with the nasal mucus. I put in fresh tea from the breakfast teapot each morning after washing out the bottle, and this serves for the next twenty-four hours, being used, indifferently, hot or cold. Two or three compressions of the bulb for each nostril and for the throat before going out and on returning has been my custom, with an extra use of the atomizer before and after seeing any suspicious case.—*Brit. M. J.* **1**: 585, March 23, 1929.

PAROXYSMAL TACHYCARDIA.—Dr. W. F. Lloyd writes: Paroxysmal tachycardia starts suddenely, and as suddenly ceases, for no apparent reason; it is generally supposed that treatment has no effect on this condition. Yet there is a very easy method of treatment, which in less than a minute causes the heart to resume its natural rhythm. If the patient is told to take in a deep breath and retain it as long as possible, in a short time the heart will be found to have resumed its normal rate. Cases of ordinary palpitation may also be cured in this way, but not so certainly. The regular uniform pressure on the pericardium seems to produce this astonishing effect on the heart.—*Brit. M. J.*, May 11, 1929.

BACTERIOLOGY OF THE THYROID IN GOITRE*

II.—SOME EXPERIMENTAL RESULTS

BY ANTONIO CANTERO, M.D., C.M.,

Montreal

IN a previous paper I have shown[1] that bacteriological study of the thyroid may be of some importance in investigating the pathogenesis of goitre. I reported at that time on the cultural results obtained from a study of 50 cases of goitre. The repeated finding of streptococci in the thyroid glands justified the carrying out of animal experiments with the organisms isolated. Since then I have investigated more cases, have re-studied the organisms, and have carried out numerous animal experiments to determine whether infection is capable of stimulating the thyroid gland to hyperactivity and to hyperplasia.

In this paper I wish to record the results of further cultures from the thyroid in cases of goitre, and the findings in animals injected with some of the strains isolated.

CULTURES

The technique of making the cultures was similar to that described previously. Suffice it to say here that the cultures were made as soon as possible after the glands were removed at operation, chiefly in tall tubes (10 to 12 cm.) of glucose brain broth and glucose brain agar (0.3), after the surface of the tissue had been sterilized in a gas flame or seared with a red-hot blade, and after the tissue had been emulsified in a specially devised sterile air chamber. This has been done in 110 cases of adenomatous goitre, with and without hyperthyroidism.

A non-hæmolyzing streptococcus was isolated in 58 cases; a gram-positive diplococcus, in 21 cases; a partially anærobic diphtheroid bacillus, closely related to the streptococcal group and similar to that described by Rosenow,[2] in 10 cases; a Gram-negative aerobic bacillus, somewhat similar, but otherwise resembling the colon bacillus in 6 cases; Welch's bacillus only, in 2 cases; and staphylococcus in 7 cases. The cultures were entirely sterile in 6 instances.

The primary cultures of these organisms in glucose brain broth were injected intravenously into rabbits. The non-hæmolyzing streptococcal strains, the Gram-positive diplococci and the partially anærobic diphtheroid bacilli all showed a marked tendency to produce lesions in the thyroid gland of rabbits, whereas Welch's bacilli, the Gram-negative bacilli, and the staphylococci produced none.

Since these organisms might be present in healthy tissues, it was thought advisable to make control cultures of normal thyroids in rabbits. In the investigation of 50 thyroid glands from normal rabbits a diphtheroid bacillus was isolated in two instances, and a non-hæmolyzing streptococcus in seven instances. In 41 instances the thyroid gland of these animals was found to be sterile. These cultures, when injected intravenously into rabbits produced no lesions in the thyroid gland of animals, and attempts to recover the strains were usually unsuccessful.

The diphtheroid-like bacillus, I believe, is not a true diphtheroid, but, as Rosenow has shown, is probably a streptococcus presenting marked involution forms. Some of these strains, while morphologically diphtheroid bacilli on isolation, become typical streptococci on pralonged cultivation, and after animal passage, as they acquire the power to grow aerobically and to produce diffuse turbidity in ascites dextrose broth, and simultaneously the power to produce acid in dextrose and other carbohydrate-containing media. The marked influence of oxygen pressure on the form of these strains, and the ability of certain strains of streptococci, under proper conditions, to show involution forms like diphtheroid bacilli, suggest strongly that the group of diphtheroid bacilli are, as their morphological characteristics suggest, really

* This study forms part of the work carried out in the Department of Experimental Bacteriology, Mayo Foundation, Rochester, Minnesota. I am indebted to my former chief, Dr. E. C. Rosenow, who has been the instigator of this research.

forms intermediate between true bacilli and cocci. Since, however, certain strains retain tenaciously their diphtheroid properties for a very long time, and since pure line requirements in these strains have not been fulfilled, it is impossible to draw definite conclusions.

EXPERIMENTS ON ANIMALS

Since preliminary experiments with *B. Welchii*, the Gram-negative bacillus, and the staphylococcus, produced no lesions in the thyroid gland, and since the streptococcus, the Gram-positive diplococcus and the apparently diphtheroid streptococcus produced definite macroscopic changes (such as hæmorrhage and congestion) soon after injection, the experiments reported here were carried out exclusively with the latter organisms.

Rabbits of approximately the same weight were the animals used for experimentation. They were kept in clean separate cages and fed on greens, oats and hay; they were weighed and examined before injection, and daily after injections. Three injections a week were given, and the duration of experiments varied from one week to three months.

The primary culture of the organism in glucose brain broth isolated from the emulsified gland was injected intravenously. For control, I injected a series of animals with strains of streptococci isolated from ulcer and gall-bladder in cases of ulcer of the stomach and of cholecystitis. The initial dose was 2 c.c. and it was increased after each injection until the maximum dose of 10 c.c. was reached; this dosage was then continued until the animal succumbed or was sacrified. In certain cases the animal would succumb after small doses had been administered, whereas in others it was found that even large doses were followed by a state of apparent well-being. Most of the animals were chloroformed for examination.

A portion of the thyroid was at once placed in a 10 per cent formalin solution as a routine for microscopic study, and other portions were removed under aseptic precautions for cultures. The injections were intravenous, the dose depending on whether the experiment was designed to show acute early lesions, such as hæmorrhage, or the more chronic lesions manifested by enlargement of the thyroid gland and increased vascularity. The lesions in the thyroid consisted of evidence of enlargement, and hæmorrhage visible to the naked eye at necropsy. The lesions in the other organs were chiefly hæmorrhages and exudations. (See Table).

The strains from the thyroid gland produced a high incidence of lesions in the thyroid gland, far above that of animals injected with other strains of streptococci isolated from cases of ulcer and cholecystitis. The high incidence of lesions in the gall-bladder and the production of arthritis in these animals, following the injection of these strains, may be the explanation of the undoubtedly frequent co-existence of cholecystitis or of the history of a previous attack of arthritis in patients suffering from

TABLE

SUMMARY OF THE RESULTS OF ANIMAL EXPERIMENTS

Sources	Condition of Strains	Animals	Strains	Percentage of Animals Showing Lesions In													
				Skin	Lymph Nodes	Thyroid	Joints	Muscles	Intestine	Stomach & Duodenum	Gall-bladder	Pancreas	Thymus	Lungs	Myocar-dium	Endocar-dium	Kidneys
Adenomatous goitre with or without hyperthyroidism	Direct isolation from thyroid	82	25	3	0	80	29	12	9	11	40	0	0	0	9	21	5
	From thyroid after 3 animal passages	41	12	2	0	70	17	0	0	12	29	0	0	5	2	10	5
Gastric ulcer	Direct from ulcer	15	6	0	0	7	14	0	7	46	20	7	0	7	0	7	2
Cholecystitis	Direct from gall-bladder wall	16	3	0	0	40	20	20	0	0	65	0	0	40	10	0	0

goitre. Prolonged subculturing of the strains on artificial media markedly reduced their affinity for the thyroid gland. This was especially noted in the first series of experiments. It was, therefore, found better to inject the strains into animals soon after isolation, and with each passage through an animal the specificity of these strains for the thyroid gland was more marked.

MICROSCOPIC ANATOMY OF THE THYROID

Sections from human thyroids showed the usual changes, and need not be discussed here. It should be stated, however, that the total number of bacteria isolated, especially in non-toxic adenomatous goitre, was greatest in those which showed marked degenerative changes. The number of organisms was always relatively small, and they were difficult to demonstrate in the tissues, but this was possible in a number of instances when the cultures yielded a relatively large number of colonies.

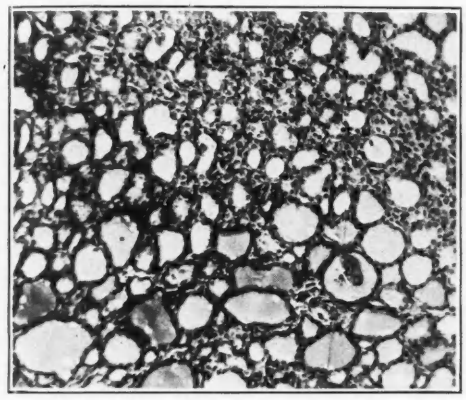

FIG. 1.—Normal thyroid gland. Control rabbit injected with sterile glucose brain broth. Microscopic examination showed a normal gland and no organisms were obtained from gland emulsion.

Before starting animal experimentation, I studied 50 specimens of thyroids from rabbits so as to determine the normal histological picture. In accordance with the findings of Rush, Jones, Crawford and Hartley[3] I found that in normal rabbits the thyroid is quite uniformly constant in its histological appearance. The cells vary in shape from flat to low cuboidal. The nuclei are very distinct and stain moderately deeply. The colloid content is moderate in amount, stains rather deeply, and is for the most part uniform. The acini may vary in size, but their shape is regular. There are no epithelial cells projecting into the acini. Epithelial cells are seen in the intervesicular tissue, but not in great number. Masses of epithelial cells may be seen. The stroma is scanty. Vacuolization of the colloid may be present, but not to any marked degree. (See Fig. 1).

In sections of the thyroid in rabbits when the experiments were of short duration, the lesions consisted chiefly of occasional hæmorrhage in the acini, of beginning vacuolization and apparent softening of the colloid, and apparent increased absorption, as manifested by the finding of colloid in the lymph channels and vessels. Active hyperplasia was not observed. (Fig. 2).

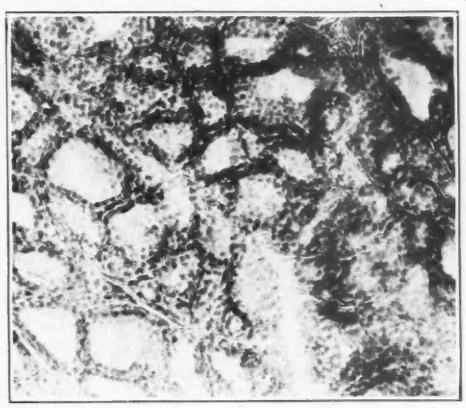

FIG. 2.—Early vacuolization and softening of colloid; no active hyperplasia. This animal received 10 c.c. of a glucose brain broth culture of a streptococcus isolated from the thyroid gland of a case of adenomatous goitre without hyperthyroidism. At necropsy the gland was engorged and enlarged. Cultures from the gland emulsion yielded a profuse growth of a green producing streptococcus.

With repeated injections the changes were more definite. In these definite enlargement of the thyroid was noticed. Microscopic examination here revealed increased vacuolization and deformity of the acini, some being completely collapsed with the lumen obliterated. An increased amount of fibrous tissue had been deposited and a definite amount of hyperplasia had taken place. (Figs. 3 and 4).

The results obtained were quite variable. Some animals seemed little affected by repeated injections and lost no weight. The thyroid did not change in size and, after death, showed no undue amount of hyperplasia. Others lost rapidly in weight, developed diarrhœa, became nervous, and died from the effects of the injec-

tions. Others were killed by chloroform. In these the thyroid was usually distinctly enlarged, and the acini showed vacuolization of colloid. Colloid was found in the blood vessels in large amounts. The colloid had a granular, vacuolated appearance and stained irregularly.

mals. A non-hæmolyzing streptococcus was isolated in 89 cases, and a diplococcus in 26 cases. Diphtheroid bacilli were obtained in 11 cases.

2. It appears as if the thyroid gland in adenomatous goitre in man harbours partial tension

FIG. 3

FIG. 4

Fetal acini. Sections from thyroid of rabbit injected with a glucose brain broth culture of a green producing streptococcus isolated from thyroid of a case of adenomatous goitre without hyperthyroidism. The experiment lasted 2 months. Autopsy revealed an enlarged thyroid gland and an arthritis of both hind limbs. The green producing streptococcus was regained from the gland emulsion. Microscopic examination revealed marked hyperplasia, an increase in the deposit of fibrous tissue, and small distorted empty acini resembling fetal acini.

SUMMARY AND CONCLUSIONS

1. In this study of 110 cases of adenomatous goitre, with or without hyperthyroidism, I have isolated a non-hæmolyzing streptococcus in 58 cases, a Gram-positive diplococcus in 21, and an apparent diphtheroid bacillus closely related to the streptococcal group in 10 cases. I have been working with 37 different strains and have carried out 123 experiments on animals. In my paper previously referred to[1] I reported the results obtained in the study of fifty cases of goitre, stressing the point that there was a marked predominance of the streptocecal flora in these cases, and also the fact that in the few experiments then carried out with the streptococcus showed a marked tendency for the organisms isolated to localize in the thyroid gland of animals. In all I have studied 160 cases of goitre, and carried out 140 experiments on animals.

organisms belonging to the streptococcal group, which when injected intravenously into animals produce enlargement and hyperæmia of the thyroid gland, liquefaction, and absorption of the colloid, and in certain cases findings which are not obtained with streptococcal strains from ulcers and cholecystitis. In some of the animals injected with goitre strains, in addition to diseases in the thyroid gland, there developed acute arthritis, loss of weight and profuse diarrhœa.

3. The mechanism of the production of hœmorrhage, hyperplasia, and other changes in the thyroid following the injection of these strains is still not definitely determined.

4. Culture and the microscopic examination for bacteria of the thyroid after injection of animals suggest, however, that the pathological changes are not the result of active multiplica-

tion of the organisms. It appears as if the thyroid gland were a favourable spot for lodgment of these strains, resulting in the local production of a relatively large amount of toxic material during their disintegration and perhaps their slow growth.

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TUBERCULOSIS IN NURSES

A STUDY OF THE DISEASE IN SIXTY NURSES ADMITTED TO THE MANITOBA SANATORIUM*

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Ninette

THIS paper is based on a study of tuberculosis in sixty nurses or nurses-in-training who have been admitted to, or examined at, the Sanatorium within the last five years. Throughout this paper the term "nurse" includes undergraduates, and indeed any who have taken any part of the regular training of nurses. Of these all but a few came direct from their hospitals to the Sanatorium. The writer saw and treated fifty, but had to rely upon the history and records of the Sanatorium and the personal knowledge of others for the remaining ten. Since the list of sixty was closed for purposes of study, and before this paper was complete, four more nurses might have been added to the list of those admitted within the five years.

At present there are ten nurses in this Sanatorium as patients, and at one time there were as many as seventeen, or about twelve per cent of the total number of female patients. If the number of female patients in the Sanatorium can be considered as any indication of the number of tuberculous women in the Province, from seven to twelve per cent represents a high average for women of one age group. There are usually as many nurses in the Sanatorium under treatment at any one time as school teachers, stenographers and university women taken together.

A preliminary study of tuberculosis in nurses was made in this Sanatorium in 1926, and data were collected from thirteen Canadian sanatoria. A total of 1,514 women had been treated in these thirteen sanatoria, of whom 99 were nurses, a little over six and a half per cent. Fifty-two of these were graduates and forty-seven undergraduates. The facts and opinions gathered in that series will be referred to in appropriate places throughout this paper, and used in drawing conclusions. A few cases are common to both series.

Of the series of sixty, forty broke down before graduation and twenty after graduation. Ten of the graduates developed symptoms within one year of graduation, five within three years, and the remainder within from five to seventeen years. Fifty of the sixty developed tuberculosis during training or within a year afterwards.

During such a four-year period, about 800 nurses were trained and graduated in this Province. About six per cent of these became Sanatorium patients directly from their training schools or within a year after leaving them. At this rate, then, one out of every seventeen young women entering upon training as nurses can be expected to develop tuberculosis. This appears far more striking when it is considered that in the twenty years following training there were three or four thousand graduates in the Province, and only ten of these, or about a third of one per cent, became patients in the Sanatorium. However, this is not a fair comparison because nurses in hospitals are more conveniently examined and among any group of women the incidence of tuberculosis is higher in the younger age group. Nevertheless, all data we have go to show that tuberculosis is relatively much more common among nurses in hospitals than nurses out of hospitals; it is more common among young nurses than older graduates, and would

* Canadian Tuberculosis Association Prize Essay 1929.

seem to be more common among nurses than among women in general.

The sixty nurses of this series came from twenty hospitals, all but five being hospitals in Manitoba. Six nurses were admitted who were training in or had trained in hospitals outside this Province, but all had their homes within it. Fifty-four nurses came from fifteen Manitoba hospitals. All the larger hospitals are represented and several of the smaller. This list might be considered fairly inclusive for nurses breaking down with tuberculosis in this Province during the past five years. The numbers of nurses per hospital were as follows: one sent eighteen, another eight, three sent four each, one sent three, four sent two each, and the remaining hospitals sent one each. The numbers who came in from the different hospitals are fairly well in proportion to the number of nurses trained in these hospitals. From this Sanatorium itself four were admitted. Three of these had pleurisy only, which cleared up completely, and one of these belonged to a heavily infected family. The only one who had a definite lung lesion came to the Sanatorium a comparatively short time after her mother's death from tuberculosis, and had a sister, not at the Sanatorium, who developed tuberculosis about the same time. It is interesting to note that from one general hospital during 1925 there were two nurses, during 1926 two, during 1927 one, and during 1928 six, four within two months. From another general hospital there were three within three months and none for many months before or after. From two other general hospitals there were two each in the same month. This may indicate that each case found increased the enthusiasm in diagnosis, but it also rather suggests what might be called an epidemic. It is our opinion that each such group of cases had some common source of infection, possibly among the patients under treatment in their hospital about that time.

Of the sixty, one entered upon training at the age of seventeen, fourteen at the age of eighteen, twelve at nineteen, eight at twenty, six at twenty-one, six at twenty-two and thirteen between the ages of twenty-three and thirty-one. A few years ago twenty-two was the youngest age at which training for nursing began. It is significant, perhaps, that three-fourths of this series began training before twenty-two, and some had even finished their training at that age. In the earlier series of ninety-nine, the age at entering training was given in only sixty-eight. However, fifty-five of these, or eighty-one per cent, had entered before or at the age of twenty-two.

In the main series of sixty, fifteen broke down before the age of twenty, and thirty-four, or more than half the series, before the age of twenty-two. Between the ages of eighteen and twenty-four, forty-three broke down. The remaining seventeen developed symptoms between the ages of twenty-five and thirty-eight.

There was a positive family history of tuberculosis for fifteen of the sixty, or twenty-five per cent, and in the earlier series of ninety-nine cases a positive family history for fifteen per cent. In some of these there is little doubt that a latent focus existed on entering hospital and became active on account of lowered resistance or massive re-infection. However, the fact that only fifteen in our series of sixty, or fifteen of ninety-nine in the other series, gave a positive family history, making all allowance for errors in the histories and lack of knowledge of family antecedents, would help to support the presumption that in most cases the infection which caused disease was received while in hospital.

Twenty-four of the sixty knew, or thought they knew, of contact with tuberculosis while in training. Some had no idea whether they had or not, and not quite all were questioned as to contact.

The sixty nurses gave a record of a total of two hundred and fifteen illnesses, or an average of three or four each, before entering training. These, as would be expected, were chiefly, and in order of frequency; measles, chicken pox, whooping-cough, scarlet fever, otitis media, sinus infection and "colds." Four had erythema nodosum, but this may, perhaps, be considered a part of their present illness and so will be discussed separately.

As will be seen, the nurses of this series entered hospital young. Most had been brought up in fairly good homes, under average or above average conditions, with time before entering hospital only for school. Few had done any definite work or had had much responsibility to carry. It is not surprising, then, that forty-five of the sixty found the work definitely harder and hours longer in the hospital than they had been accustomed to. In hospital, the environment, routine and even the food was different. The period of probation was one of hard work and some worries. With the actual work of nursing came more responsibility and increased emotional

and physical strain. Besides hard work, there were classes to attend and studies to pursue. There had been for almost all an increase in social obligations or opportunities, even if only among the pupil nurses themselves. The hour of rising was necessarily much earlier, and they got to bed, whether necessarily or not, mostly later. In all these changed conditions there was much to lower resistance, even though there may have been elements in the life to increase resistance also.

Their breakdown had no special relationship to any particular hospital service. Some considered that the harder services played a part, and most had the idea that night duty was unfavourable. In the series of ninety-nine cases, seventeen had been on eight hour duty, fifty-seven on twelve hour duty, and for twenty-five the hours were not stated. Forty-three of the sixty developed symptoms of tuberculosis while in training, though three of these graduated before they came for treatment. Twenty-five broke down during the first half of their course, eighteen during the first year, thirteen in the second year, and twelve in the third year. Four fell ill in the first three months and twelve in the first eight months of their training.

Of the twenty who came to the Sanatorium as graduates, ten had broken down during the first year after graduation. It is very interesting to note that eight of these had remained in their hospitals on staff positions. Three years after graduation five more had broken down, by seven years four more, and for one the breakdown came seventeen years after graduation, though she had had a pleurisy even before training. During training and in the five years following, fifty-five out of the sixty broke down. It appears to be a very striking fact that the period of training and the time of breakdown correspond so very closely. In the three years of training and one year after, fifty of the sixty had their breakdown.

THE CLINICAL STUDY OF THE SIXTY

Thirty-four had what might be called an acute onset and twenty-six a more insidious onset. A few of those who developed basal lesions had such a very acute onset that their disease was considered not unlike the childhood type.

The relationship of the onset of symptoms to the diagnosis varied. Fourteen were correctly diagnosed within a few days or a week after the onset of symptoms, twelve within a month, and twelve within two months, or thirty-eight in all within two months of developing symptoms. Most of the rest remained undiagnosed for from three to twelve months. For comparison, a study was made of the last sixty women, apart from nurses, admitted to the Sanatorium. Sixteen of these were diagnosed early, sixteen moderately early, and twenty-eight late in their disease. Using the same standards of classification in the series of sixty nurses, thirty-seven were diagnosed early, sixteen moderately early and seven late. The nurses were diagnosed much earlier, and that meant that they also got treatment much earlier. Earlier diagnosis of nurses in training should be expected, since their place of work is in hospitals whose whole business is the caring for disease. The x-ray was easily accessible in all cases. General hospitals are now realizing the definite possibility of tuberculosis among their nurses, so are much more alert regarding its early discovery. Another reason for earlier diagnosis is that nurses, as a rule, had an onset of disease with more acute symptoms, and so required medical attention early.

Cough was remembered as the initial symptom, or at least as noticed early, by thirty-six; pain in the chest by thirty-one; tiredness by twenty-six; elevation of temperature by twenty; expectoration by fifteen; and loss of weight by thirteen. Hæmoptysis was the first symptom noticed by six. Other symptoms, complained of less frequently, were: frequent "colds," weakness, fainting, nervousness, hoarseness, malaise and dyspnœa. In cases in which peritoneum, kidney, or eye were diseased, the early symptoms were referable to those organs. Four had erythema nodosum and later developed pulmonary disease. The most frequent early symptom-complex was cough, tiredness, pain in the chest and elevation of temperature.

In twenty-five the lesions were mainly apical, and thirteen of these had gone on to cavity formation. Nineteen (one-third of the pulmonary cases) had hilar or basal lesions. One had typical miliary disease and died, and one a miliary spread resembling very much that of the former, but she is alive and well, though still "taking the cure" at home. Nine had generalized bilateral fibro-caseous disease. Twenty-four of the sixty had cavities as shown by x-ray plates on admission. Of these, four are dead, twelve are still on treatment, and eight are working. Nineteen had the right lung involved, twenty-three the left lung, and fourteen both lungs.

Twenty of the sixty had a pleuritic onset,

eighteen of these with effusion and twelve with definite parenchymatous disease. Four had tuberculosis of peritoneum, two of kidney, one of eyes, and one of glands.

Erythema Nodosum.—Four of our series, as has been already stated, had erythema nodosum. All these were pupil nurses and had returned to duty as soon as their illness subsided. All later developed pulmonary disease of the acute hilar and basal type.

General hospital people, and we of the Sanatorium, have been impressed by the large number of nurses who have developed erythema nodosum. Opinions still differ as to its etiology and significance, but from our experience, especially in the case of nurses, there is but one safe procedure, and that is to consider it a manifestation of tuberculosis and to treat it as such. A physician of wide experience in tuberculosis, on the staff of a general hospital, and one much called in consultation about suspected nurses, states that when erythema nodosum patients are put to bed for from three to six months and treated as tuberculous people they almost invariably do well, whereas if not given this rest in bed they very often go on to definite pulmonary disease. Erythema nodosum, we consider, should be classed as in about the same relationship to tuberculosis as pleurisy with effusion. All who have had either pleurisy or erythema nodosum should have the significance pointed out and should have periodic, careful examinations, with well-taken and well-read x-ray plates of the chest. Dr. H. B. Cushing, in *The Canadian Nurse*, June, 1928, points out that the relationship of erythema nodosum to pulmonary tuberculosis, especially among nurses, is definite.

Is there a special type of tuberculosis in nurses? Of the sixty, eight in x-ray plates and by physical signs showed disease extending out from the hilus, and eleven showed disease mainly in the bases of the lungs; that is, nineteen, or more than one-third, of those with pulmonary disease had either hilar or basal lesions. This type of tuberculosis is not common; indeed, it is frequently stated that primary basal lesions in adults occur in less than one-fourth of one per cent of cases. The proportion among the nurses ofthis series is therefore relatively extremely high.

Seven of the nineteen nurses who had basal lesions were graduates who had remained on the nursing staff in the hospital; twelve were still in training, nine of these being in their final year. With this same basal type, nine were twenty-two years of age or less at the time of breakdown, and the remaining ten were from twenty-three to thirty-one. Six gave a definite family history of tuberculosis, and nine recalled definite opportunity of infection while in training. All but three had found the work in the hospital much harder than they had been accustomed to before entering. Fifteen of the nineteen had an acute onset of symptoms. Nine had their onset with pleural effusion, and when the effusion cleared up revealed underlying acute basal or hilar lesions in the lung. Nine had cavities demonstrable in x-ray plates. Seven in this series with basal lesions were treated by pneumothorax. The four who had erythema nodosum all belonged to this basal lesion series. At the present time, ten are working, eight are still on treatment, either at the Sanatorium or at home, and one is dead.

The following case histories and plates demonstrate the special type of disease found in so very unusual a proportion of the nurses of this series:—

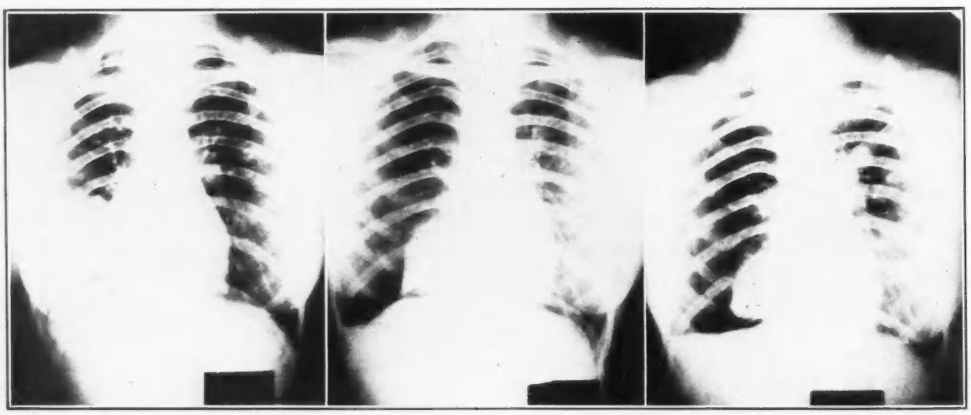


FIG. 1 FIG. 2 FIG. 3

CASE 1

Miss L., aged 25, admitted May 12th, 1925. No family history of tuberculosis. She was born, and lived, on a farm, attended school until seventeen, took a business course and did office work until she entered training at twenty-one. She graduated in January, 1925. In February, 1925, she noticed tiredness, in March began to cough and noticed that weight had been lost. At this point a diagnosis was made, and on admission to the Sanatorium there was a gross lesion in the lower half of the right lung with cavitation. (Fig. 1.)

18. Her first illness which might be related to present illness, and which occurred while in training, was classed as "acute bronchitis." This was in October, 1924. She had an infected antrum and otitis media in January, 1925, pleurisy in May, 1925, when she was under treatment for four months, and then returned to duty. (Fig. 5.)

Two years later, about one year after graduation, while on duty as staff nurse, and about three months before admission to the Sanatorium, she became aware of weakness, tiredness, and began to have pain in her right chest. On admission she showed an extensive lesion

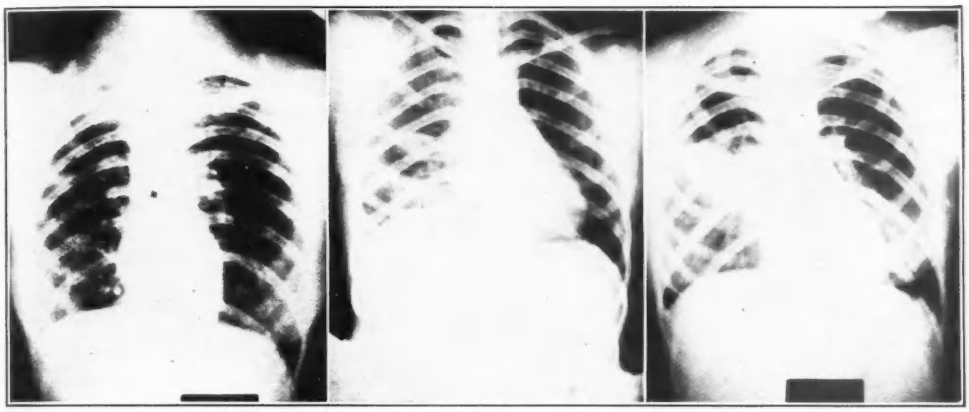


FIG. 4 FIG. 5 FIG. 6

Pneumothorax was started almost at once and collapse fortunately was "selective;" that is, the part needing collapse was the part which collapsed most. (Fig. 2.)

She immediately improved and progress was uninterrupted, except for a slight temporary extension of disease out from the left root. (Fig. 3.)

After two years' collapse, the lung was allowed to re-expand. The patient was free of symptoms and the plates were almost clear. (Fig. 4.)

She remained for several months on the nursing staff of the Sanatorium, then married; and is in good health, though she has taken the added risk of maternity, and has one child.

CASE 2

Miss J., aged 22, admitted on July 12th, 1927. No family history of tuberculosis. She lived on a farm and in a small town, and entered hospital for training at

extending out from the hilus and into the base of the right lung, with definite cavity formation. (Fig. 6.)

Symptoms were marked. Pneumothorax was attempted several times without any success. On full infirmary routine her general condition improved, but she had frequent hæmorrhages, troublesome and increasing cough, and profuse expectoration. The area of the lesion as shown by plates had definitely increased also. (Fig. 7.)

Avulsion of the phrenic nerve was done in October, 1928. This was followed by an uusual degree of elevation of the diaphragm, and x-ray plates show the cavity obliterated. (Fig. 8.)

She is now in excellent general condition and has practically no cough nor expectoration.

CASE 3

Miss M., aged 24, was admitted on December 5th, 1927. There is no family history except that a sister

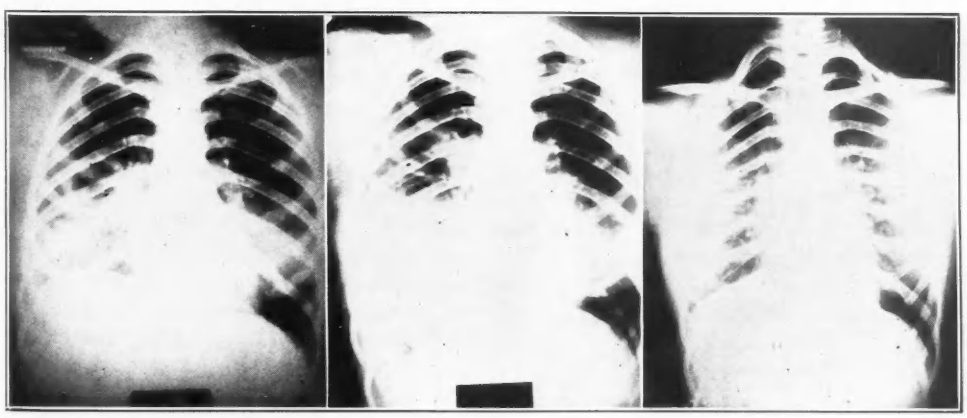


FIG. 7 FIG. 8 FIG. 9

also a nurse and also in this series, has a small lesion, as shown by the x-ray. The home conditions were very good. She began training at eighteen, and found the work hard and was tired most of the time. She graduated in 1925, worked as staff nurse for one year, and did special nursing during 1927. She had had bronchitis in childhood and an appendectomy while in training. In April, 1927, she had pleuritic pain in the right chest. Plates which were made at that time show definite abnormal shadows extending out from the right root (Fig. 9), although, strange to say, diagnosis was not made; at least, the patient was not told of one, and was allowed to return to work. Later, in September of the same year, she took acutely ill with pleurisy and effusion, and had cough and positive sputum.

When first seen at the Sanatorium, there were extensive lesions at the right base, with cavitation, and some effusion. (Fig. 10.)

Pneumothorax was started and, although adhesions at the base have prevented a complete collapse, it has been very effective. (Fig. 11.)

She is in excellent physical condition, without cough or expectoration, and is doing a little light work.

CASE 4

Miss C. Figures 12 and 13 show very acute basal lesions in the right lung. In this case, pulmonary symptoms were noticed three months after an attack of erythema nodosum. The disease has been steadily progressive, in spite of strict bed care, pneumothorax and phrenicotomy, and at the present time the prognosis is considered unfavourable.

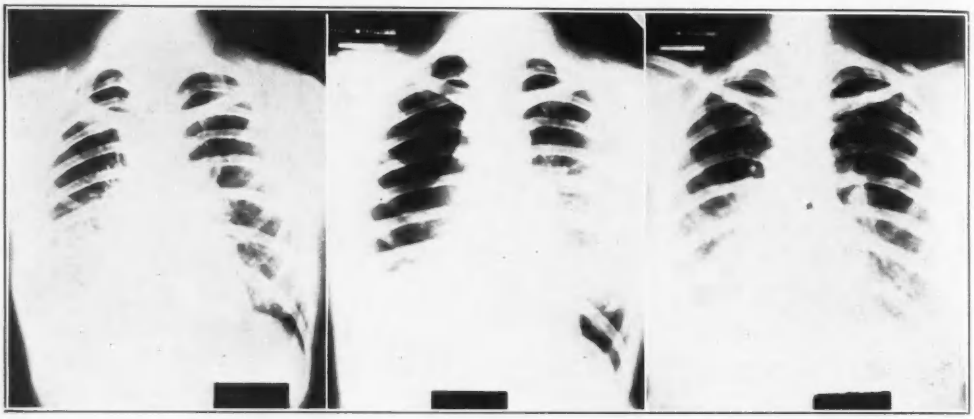


FIG. 10 FIG. 11 FIG. 12

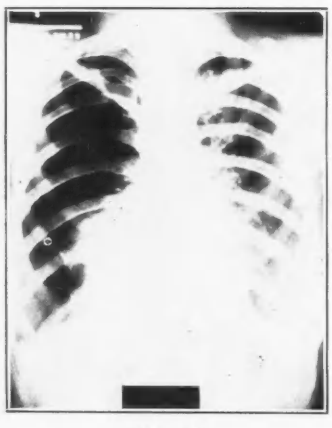


FIG. 13

It would seem to us associated with hospital training and work that there is a special prevalence of this acute type of disease. The majority in this special series with basal lesions broke down toward the latter part of their course or while in hospital work soon afterwards. More than half of them entered training before the age of twenty and broke down before the age of twenty-two. One-third had a positive family history of tuberculosis, and half of them knew of possibility of infection with tuberculosis while in hospital. In nearly all there was an acute onset, pleuritic in nine, with real underlying pulmonary disease. Erythema nodosum, which may be an allergic manifestation of tuberculosis, occurred in four. We offer as explanation of the special type under these special conditions the suggestion that most of these girls had very little tuberculous infection before entering hospital and consequently little opportunity to build up an immunity. They then, while resistance was lowered by unaccustomed work, and while among cases in the wards in which tuberculosis was a background disease, had opportunities to become heavily infected and so developed disease of a type not very unlike that in children who have met with massive infection.

TREATMENT

Of the sixty, seven were examined and advised at the Sanatorium from time to time, but were not admitted. Seven were in the Sanatorium more than twenty-four months; thirteen from twelve to twenty-four months; thirteen from six to twelve months; nine from three to six months; and eleven for three months or less. Seventeen had artificial pneumothorax. Fifteen

were given employment on the Sanatorium staff for a time, and thus were kept under supervision and tried out. Nine of these latter were among those who had pleurisy with effusion which had been cleared up by several months in bed.

Pneumothorax is more urgently indicated in acute hilar or basal disease than in ordinary apical disease. Many had a very acute allergic type of onset and cavitated almost immediately. In these especially pneumothorax should be begun at once. If it is begun early, collapse is usually selective and does not have to be kept up as long as in cases of the usual types with more fibrosis. Most of those of all types who began treatment early did well.

Of the sixty, thirty-one are now working and in apparently good health. Twenty-four are still on treatment, ten of these at the Sanatorium and the remainder at home, and almost all doing well. Five of the sixty are dead.

CONCLUSIONS

1. Sixty nurses have been admitted to this Sanatorium during the past five years. This is far beyond the proportion in which women of the Province in general, or any other class of women in the Province, have been admitted, and more than the proportion of girls of their average age also.

2. These nurses, who have come for treatment of tuberculosis, have with very few exceptions broken down during their training in general hospitals, or during the first year after that training, often while still on the staffs of general hospitals.

3. Fifty of the nurses in this series broke down during their training or within one year of graduation. This constitutes about six per cent, or one in seventeen, of the nurses in training within Manitoba during the same four-year period.

4. We consider that among the conditions unfavourable are the early age of entering upon training as nurses, the previous freedom of these girls from contact with disease, the softness of those unaccustomed to hard work, the comparatively little tuberculous infection they had met and the consequent lack of immunity built up. If nurses were not allowed to enter upon training until twenty-one years of age perhaps fewer would develop tuberculosis. The hours of work are, perhaps, well regulated, but it is important to investigate the *hours of energy expenditure*. Supervision should be strict and the hours of sleep adequate.

5. Nurses on entering training should have a complete physical examination, and well-taken and well-interpreted x-ray plates of the chest.

6. An unfavourable condition in all general hospitals, we consider, is the presence of patients who are under treatment on account of special illnesses and needs, for operations, on account of fractures, childbirth, etc., etc., who have general chronic disease as well, which is not always fully enquired into, and which may be and often is at an infective stage.

A man had an ischio-rectal abscess and during five years had several operations in general hospitals. After the latest of these the wound sloughed and would not heal. On examination of the chest, then, he was found to have gross disease throughout both lungs with cavities, and on questioning him it was found that he had had cough and expectoration for years. No special precautions had been taken about his cough or expectoration. It can easily be seen that nurses not on their guard could easily be infected in the care of such cases.

7. General hospitals could be made more safe for their nurses. *All patients entering general hospitals should have a thorough history taken and a complete physical examination.*

Tuberculous people in general hospitals may be safely treated if known and classed as tuberculous, and if the training and experience of the nurses includes the essential measures for the care of the tuberculous. But undiagnosed and "untagged" tuberculous patients are always a danger, and especially so if the routine teaching and training of nurses in general hospitals do not include measures necessary for the proper and safe care of the tuberculous.

Nurses should receive definite and ample teaching about tuberculosis and the routine for tuberculous patients. *A cough is practically always dangerous, whatever the cause.* Every cough should be covered. Apart from tuberculosis, much could be done to prevent the spread of other upper and lower respiratory infections. Nurses presumably are instructed about the care and proper disposal of all other discharges and excreta, but the dangers of cough and expectoration they do not know so well. A woman recently admitted from a general hospital where she had been for six weeks, under treatment for advanced tuberculosis, had never been instructed to cover her mouth while coughing.

It is very rare to have a Sanatorium nurse break down with tuberculosis. Some reasons for this are: the work on the whole is less strenuous, routine and energy expenditure, apart from nursing duties, is usually of a quieter variety; all patients are known to be tuberculous and considered infective; proper precautions about cough and the disposal of expectoration and discharges are carried out. And it is also considered that by repeated small doses of tuberculous infection some immunity is established. The Lady Superintendent of the Trudeau Sanatorium, in which there is a school of nursing for women who have been tuberculous, but who, in affiliation with general hospitals, take a regular course of nursing training, states: "These students begin with a definitely known handicap, but with the well regulated life they lead they are able, for the most part, to go through with little difficulty."

8. There is a special type of tuberculosis to be made out characteristic in the nurses of this series. Over one-third of them had basal or hilar lesions. It is somewhat similar to the type of disease in childhood, and likely the causes are the same. Children who have been kept away from infection develop acute disease, often basal. Young nurses from good, careful homes have met with little infection and developed little immunity, so if they meet with infective cases, especially if resistance is lowered, and are not on their guard and protected by a proper routine, they are virtually in the position of children.

9. If treated early, and especially with pneumothorax, most of those with basal lesions do well.

HYPOPITUITARISM WITH SPECIAL REFERENCE TO ITS SEXUAL MANIFESTATIONS*

By N. E. Berry, M.D.,

Montreal

IN presenting this case which concerns the pituitary gland I should like to review briefly a few points of historical and scientific interest.

Our earliest conception of the function of this peculiar structure comes from Galen. His idea was that it acted as a filter for the sedimented waste products of the brain and that these passed out through the infundibulum as a *pituita* or slime from the nose. Now Galen was a true investigator who did much to rid the profession of the superstition with which the art of healing had always been associated; his writings were by far the best of ancient Rome; his dictum was law. It was, therefore, not surprising that this conception held sway for many centuries. As late as 1631 Robert Flood explained the etiology of coryza on the principle of a siphon action between the ventricles and the nose. Schneider, Willis, and others could not demonstrate any such communication, and, yet, how could a spontaneous cerebro-spinal rhinorrhœa, of which their learned predecessors most certainly had knowledge, be otherwise explained? Could they have known that in the lowest of vertebrates a canal lined by ciliated epithelium connects the cerebral and buccal cavities they would never have doubted the earlier teaching of Galen. In Thomas Gibson's anatomy (1688), it is inferred that in animals, such as calves, who have a large pituitary with rich arterial supply the gland seems to have the same relation to this arterial plexus, which he calls the *rete mirabile*, as the pineal gland has to the choroid plexus; its purpose is to separate a serous fluid from the lymph (a well established fact). But in man, according to the best anatomists, this rete is wholly wanting, showing that the pituitary must be of relatively less value to him than to the lower animals.

We smile, and yet all that was known at the beginning of the present century was that acromegaly and gigantism were associated with disease of this organ. Various observers then called attention to the fact that tumours and cysts of this gland were also associated with a heterogenous group of conditions comprising altered development, sexual infantilism, optic atrophy, metabolic changes, etc.

These and coincident observations led to a

* From the service of Dr. David W. MacKenzie, Royal Victoria Hospital, Montreal.

scientific investigation of this organ, but its inaccessibility and small size rendered first operative results variable and untrustworthy. Indeed it was said that no untoward results followed its removal and that probably it was vestigial. It remained for a Roumanian investigator, Paulesco, and Drs. Cushing[1] and Redford, of Harvard University, to develop a proper operative approach to the canine hypophysis, and to show conclusively that total extirpation leads to a rapidly fatal syndrome. This syndrome is characterized by somnolence and a progressive fall in metabolic rate, as manifested by slow pulse and respiration, with a temperature which falls almost to that of its surroundings before death. It is, therefore, essential to life.

To attempt to present an outline of the investigations which have been carried out would be time-consuming, and to attempt to summarize the results would be exceedingly confusing, as they are not uniform; further, it is agreed that the last word has not yet been said. I shall proceed therefore with a few bold statements which, I believe, have been fairly well established, and shall return to some of the work which bears upon the case which I wish to present.

The hypophysis, situated in the sella tunica, is composed of two separate and distinct parts. An anterior epithelial portion originating from the roof of the pharynx, which influences growth and sexual development and is essential to life; and a posterior portion, arising from the third ventricle, which influences metabolism of carbohydrates and fats. The posterior portion may be further divided into a pars intermedia of similar origin. It has been claimed that this intermediate portion influences the concentration of urine. This faculty is often markedly impaired in diseases of the hypophysis and associated structures, and gives rise to the well known clinical condition diabetes insipidus. There is no agreement, however, as to the mechanism of its production, or as to whether the fundamental factor is a nervous or a secretory disturbance.

It is difficult to group clearly disturbances of this gland into deficiency and excess, and Cushing prefers the broader term "dyspituitarism," yet fairly well defined hypo- and hyper- types are recognized. Hyperpituitarism occurring before union of the epiphyseal lines gives rise to gigantism; occurring thereafter it gives rise to the well known clinical entity, acromegaly.

As regards hypopituitarism I wish particularly to call attention to a condition described by Froelich and named by Bartels "dystrophia adiposogenitalis." It is characterized clinically by infantilism, genital hypoplasia, imperfect acquirement of the secondary sexual characteristics, general adiposity, the presence of pads of fat in the pectoral regions and on the hips, disturbance of metabolism, and mental dullness. There is often a tendency to reversive sex phenomena. Thus the male may have a broad shallow pelvis, and if there is any hair the hair line is transverse instead of pyramidal; the skin is soft and there is no beard. The female on the contrary may assume masculine characteristics in these respects.

These observations on unusual sexual development or lack of development have led to much experimental work to determine the relation of the pituitary gland to sexual activity, and in answer to this question I may refer to the work of Goetsch, of Harvard University, and of Smith and Engle,[2] of Stanford University. In 1913, Dr. Goetsch, in a carefully controlled study of a series of young rats, found that daily oral administration of bovine anterior lobe during the pre-adolescent period had a remarkable stimulating effect on the development of the reproductive glands of both sexes. This was shown not only by early sexual maturity and precocity in raising families but also by demonstrable histological evidence of precocious ovulation and spermatogenesis. In 1927 Smith and Engle made an extensive series of daily transplantations of anterior pituitary tissue from mice, rats, cats, rabbits and guinea pigs into sexually immature mice and rats. In the female they were able to produce precocious sexual maturity with the appearance of all the characteristics of animals maturing normally and shown by mating. In animals ten days old these changes were invariably produced after five transplants, and in animals seventeen days of age they were produced after three transplants. In rats transplants were begun as early as fourteen days and sexual maturity induced in twenty-two days. In older animals fewer

transplants were necessary. These authors draw attention to the uniformity in the time of response after transplantation contrasted with the great variability in age in rats maturing normally. In mice the average age of puberty is about thirty-five days with the variation about twenty-one days (Smith and Engle); and in rats the average, seventy-two days with a variation of seventy-five (Long and Evans[3]). The absolute weights of the ovaries of treated animals exceed those of litter mates in the case of mice by as much as nineteen times, and in rats by ten times; they also exceed those of litter mates maturing in the usual time—this increase being due to an increased number of normal follicles. Superovulation was the rule, as many as forty-eight normal ova having been found in one tube in twenty day old treated mice and in twenty-six day old treated rats. The uteri and vaginæ in weight and structure were similar to those of the adult animal. There was a similar response in the immature male, though not so striking as in the case of the female. In the adult female there is a marked response in the ovaries with increase in the number of follicles and superovulation as in the immature female. In the adult male they were able to show no response beyond an increased sexual appetite.

They have shown that the hormone acts only through the gonads, since if they are removed no change is induced. It is interesting to recall at this point the puberty gland theory of Steinach. He attempted to correlate the seat of hormone production in the interstitial cells of the ovary and testis which he claimed induced puberty and maintained sexual activity. The work to which I refer would tend to disprove this, and, further, it was shown that the hormone does not act through the intermediary of other endocrine glands, since the same changes could be produced in animals from which the thyroid and adrenals had been removed and could not be produced by the transplantation of any tissue other than the pituitary. They also showed that pituitary tissue from sexually immature animals and animals past the menopause will produce similar effects although it does not do so when *in situ*, probably because it is not liberated. Lastly, after hypophysectomy the gonads degenerate, the follicles become atretic, and spermatogenesis ceases. Here again, anterior pituitary transplants cause a resumption of follicular development and a reappearance of œstrus in the female and induction of spermatogenesis in the male.

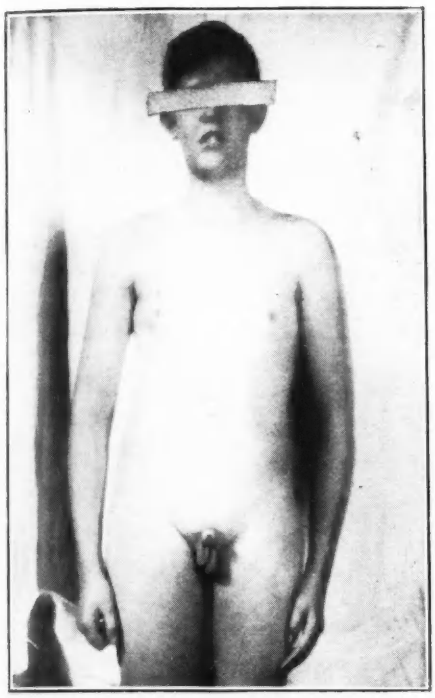
These and other observations suggest then that many of these anomalies of sexual development, such as the case I am about to present, are, in all probability associated with a lack of the influence of the anterior pituitary hormone.

CASE REPORT

This boy first consulted Dr. MacKenzie three years ago, at the age of sixteen. His parents sought advice because of his lack of sexual development and the absence of the usual manifestations of the onset of puberty. Examination showed a small well nourished boy who, mentally and physically, appeared much younger than the stated age. One was at once struck by the entire lack of sexual development. The penis and scrotum were comparable to those of an infant. There was an entire absence of hair over the pubes, in the axillæ, and on the face, and the voice was high pitched and puerile. The tendency to the female type was particularly well marked. The smooth skin, absence of beard, the voice, the narrow chest and wide pelvis, with prominent mons veneris, attracted attention at once. There was nothing else of note in his general physical examination except a very highly arched palate and a prominent upper incisor directly in the mid-line. The blood pressure was, systolic 95; diastolic 55. Laboratory examination showed a urine of normal quantity and quality. Kidney function tests were normal. The blood chemistry was normal; the blood Wassermann test was normal. The visual fields were normal. The sella turcica, as determined by x-ray examination, was normal. Basal metabolic rate, minus twenty. The boy had an increased specific dynamic action of fat and glucose and a decreased specific dynamic action of protein.

In the absence of anything to suggest tumour or cyst of the pituitary we believed this to be a case of hypopituitarism, corresponding to the type described by Froelich, and, while clinical and experimental evidence support the view that the anterior pituitary is chiefly at fault, yet the combination of sexual infantilism and adiposity has been observed in disease of other endocrine glands and there can be no doubt as to their close association.

The treatment is, of course, surgical when there are signs of increased intracranial pressure or other evidence of tumour. It is to that type of case where there are no such definite signs that these remarks are chiefly directed. These cases are not often seen and they progress so slowly that one is apt to lose track or lose interest in them, hence it is difficult to collect any very comprehensive data. In a series of twenty-seven cases, followed seven years at the Post-Graduate Hospital, New York, Eidelsberg[4] claims fair results using whole gland extract.



In many cases he claims to have brought about normal sexual development, as manifested by menstruation and growth of hair. General development has been improved in stunted patients, the blood pressure raised and excessive obesity relieved. One patient, weighing 347 lbs. lost 45 lbs., and another 65 lbs. The best results were obtained in younger patients, and it was necessary to give doses of fifteen to seventy-five grains a day for long periods.

Our internist recommended surgical pituitrin hypodermically for our case when he first came to us, and we decided to give it a trial.

January, 1930.—For the past three years this boy has been under observation from time to time, and during this period has been given a large number of injections of surgical pituitrin. He is now nineteen years of age. His height is five feet seven inches, as compared with five feet three years ago; his weight is 110 lbs. as compared with 95 lbs. The blood pressure, systolic 100, diastolic 55, as compared with 95 and 55. The basal metabolic rate is — 11.4, as compared with — 20.

Though there has been this marked improvement in his general physical development, and I think a slight advance in genital development, there is as yet no notable evidence of precocity. A glance at the accompanying picture will confirm this. Though he has become much taller and relatively thinner he retains the broad flat pelvis with prominent mons pubis and comparatively narrow chest. There is no indication of growth of hair on the face, over the pubes or in the axillæ, and his voice remains unchanged. He has been examined by Dr. David Slight, Assistant Professor of Psychology of McGill University, who reports that he comes up to normal according to the Binet-Simon intelligence tests. His progress at school has, however, been slow; he frequently changes from one institution to another and is making no real progress. The possibility of his becoming a useful member of society would appear to be remote, and the prospect of his attaining even a useful degree of sexual development is even less encouraging.

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THE ACID-BASE EQUILIBRIUM OF THE BLOOD IN ACUTE RHEUMATISM.—The theory of the infective origin of rheumatism, now commonly accepted, raises the question whether the causal organism may be one that produces an acid toxin. In order to obtain evidence for or against this hypothesis, L. G. Parsons and S. H. Edgar (*Arch Dis. Child.* p. 291, October 1929) have investigated the acid-base balance of the blood in rheumatism. Normally the pH of the blood is extremely constant, but certain pathological conditions can induce an acidosis or an alkalosis. Usually, however, any change tending to occur is speedily regulated by alterations in the excretory systems, which neutralize the disturbing effect and keep the pH constant. This is not always so, and should a point be reached where the regulating mechanism is unable to cope with the disturbing factor—as, for example, in diabetes, where the production of non-volatile acids is continuous—the pH will be altered and an abnormal figure obtained. To ascertain the acid-base balance, or equilibrium, of the blood two estimations are necessary—namely, of the pH and the carbon dioxide content. These tests were applied to the blood of 53 children, all of whom had received institutional treatment for a period of one to two years or even longer. The results showed that the acid-base equilibrium of children suffering from acute rheumatism, whether in the acute, convalescent, or quiescent stages of the disease, was normal. The authors conclude that there is thus no evidence in favour of the view that the symptoms of rheumatism are due to an excess of acid in the tissues, or that the rheumatic child is an "acid" child. As regards other factors, Edgar has investigated the variability in blood calcium in rheumatism, and his results support this conclusion.—*Brit. M. J.* **1:** Ep. 6, Jan. 4, 1930.

RECENT ADVANCES IN THE RENAL SURGERY OF CHILDHOOD*

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THE recent introduction of special cystoscopes of small size has permitted, for the first time, investigation of the genito-urinary tract of children with the same completeness that for many years has been possible in adults. As a result of these improved methods of investigation new light has been thrown upon many obscure genito-urinary lesions of childhood. A new field of surgery, limited in extent, but of interest and importance, has been thrown open for investigation. This may be an inappropriate time to review such recent acquisitions to our knowledge.

The methods of investigation merit a moment's attention. Standard cystoscopes are now made as small as 22 French for the double catheterizing type, and 18 French for the single catheterizing type. With these instruments it is possible to perform cystoscopy and ureteral catheterization upon boys as young as five years and girls as young as three years. For smaller children, special cystoscopes are available, such as the Beer infant cystoscope. This sacrifices certain mechanical details of the standard instruments, but with it excellent pyelograms may be obtained of infants under one year of age. (Fig. 1). These small cystoscopes are marvels of the instrument makers' art, and too great tribute cannot be paid to the mechanical skill which has developed them. Next to small instruments, the greatest aid in the cystoscopy of children is caudal anæsthesia. General anæsthesia is contraindicated; it raises the procedure to the magnitude of a major operation; it causes diminished secretion of urine, and renders pyelography dangerous, since there is no means of preventing overdistension of the kidney pelvis. The injection of 5 to 15 c.c. of 3 per cent novocaine solution through the sacrococcygeal hiatus into the sacral canal produces satisfactory anæsthesia of the genitals in the great majority of patients. Caudal anæsthesia and small cystoscopes have made possible the cystoscopic examination of children.

FIG. 1.—Pyelogram of a normal urinary tract in an infant 10 months of age. To illustrate the facility with which infants of small size can be examined by standard methods. This child was the victim of neurotic parents who brought it to hospital stating that enormous quantities of urine were being passed.

CHRONIC PYELITIS

The commonest lesion of the urinary tract of children is that termed "pyelitis." This should not be regarded as an accurately descriptive pathological term. Indeed, it is loosely used to describe most conditions of which the outstanding feature is pyuria, and hence is frequently applied to conditions other than true pyelitis. It is a fact, however, that young children, particularly female children, are prone to an infection of the upper urinary tract which is characterized by abrupt onset, high fever, chills, pyuria, and a tendency to remissions. This we erroneously term acute pyelitis. The inflammation is not limited to the renal pelvis. The

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chief lesions are in the kidney, which shows inflammatory streaks extending from the calyces into the renal parenchyma along the collecting tubules. The renal pelvis shows little evidence of inflammatory reaction. It seems most likely that what we term pyelitis is in reality an ascending infection of the kidney substance, and that it is renal infection and not pelvic infection which gives rise to the symptoms and pyuria. The condition is a variety of pyelonephritis and is not pyelitis. The great majority of these cases of so-called acute pyelitis recover spontaneously or under treatment in a relatively short period of time, and hence do not reach a stage which demands cystoscopic examination. Occasionally, a patient passes into a chronic stage, characterized by persistent pyuria with intermittent attacks of chills, fever, and increased pyuria. We have had the opportunity to investigate several of these cases of chronic persisting pyelitis. The urethra, bladder and ureters show no signs of mechanical obstruction or dilatation. The kidney pelves are normal in outline. Not infrequently the persisting kidney infection is unilateral, and these cases are characterized by pyuria from one ureter only and greatly diminished renal function on that side. In one such unilateral case, in which the infection was extremely resistent of treatment, and the renal function low, the damaged kidney was removed. This resulted in great improvement in the patient's health. The kidney had been reduced to a small, much scarred mass, with extensive inflammatory infiltration. However, too little opportunity has yet presented itself for the investigation of these cases of chronic pyelitis. They remain, for the present, an incompletely solved problem.

THE OBSTRUCTIVE UROPATHIES, WITH OR WITHOUT INFECTION

A great many cases of so-called chronic pyelitis upon investigation prove to be cases of infection of the urinary tract behind a mechanical obstruction. In other words, the cause of chronic pyuria in children is often mechanical obstruction somewhere in the urinary tract. It is amongst this group of cases that the new investigative methods have added most to our knowledge. Prior to their use the presence of mechanical obstruction in the urinary tract of children was regarded as an extreme rarity.

The sequence of pathological changes which follows prolonged obstruction to the outflow of urine is now well recognized. If we follow this sequence in the case of an obstruction at the neck of the bladder, or in the urethra, we shall find that the difficulty in emptying the bladder leads first to more powerful expulsive efforts on the part of the bladder musculature, and in consequence to hypertrophy of the bladder musculature. In spite of the increased expulsive effort, the bladder does not succeed in emptying itself completely; more or less residual urine is present after micturition. Increased muscular effort leads to greatly increased tension within the bladder, and this, when long continued, results in herniation of the bladder mucosa through weak spots between muscle trabeculæ, giving rise to trabeculation of the bladder or even to diverticula. Long continued increased intravesical tension sooner or later breaks down the competency of the valve at the lower end of the ureter and permits urine to regurgitate from the bladder up the ureter to the kidney pelvis. This causes dilatation of the ureter (hydro-ureter) and of the kidney pelvis (hydronephrosis). Prolonged back pressure upon the kidney damages the kidney substance and diminishes renal function. If the back pressure is of high degree and long continued death ultimately occurs from uræmia due to progressive kidney damage.

To the destructive changes resulting purely from mechanical obstruction there may be added the destructive changes resulting from infection. The obstructed urinary tract is singularly prone to infection. So long as the urine flows freely through the urinary passages serious infection seldom occurs. If urine becomes stagnated behind an organic obstruction it is easy for infection to gain a foothold, and under the circumstances it persists until the obstruction is relieved. The obstructive cases, therefore, divide themselves into two groups: (*a*) those without infection, characterized by symptoms due to mechanical difficulty in emptying the urinary tract (dysuria, frequency, and pain); (*b*) those complicated by infection in which the predominating symptoms are of infection of the urinary tract (fever, pain, dysuria, frequency and pyuria).

A similar picture of progressive destruction due to prolonged back pressure is produced when the obstruction is at a higher level in the urinary

tract, *e.g.*, in the ureter. In such a case, of course, the damage is limited to the part of the tract above the obstruction. Moreover, the higher the obstruction the less frequently is it complicated by infection. It is convenient, therefore, to group the cases according to the site of the obstruction.

Urethral obstruction. — Urethral obstruction is present in male children only. With a few rare exceptions it is due to one cause only, viz., congenital valves in the prostatic urethra. This condition is rare, though probably not so uncommon as one might suppose. I have seen three cases in the past year. These patients usually have a history that from birth they have voided frequently and with difficulty.

FIG. 2.—Cystogram in a case of obstruction in the prostatic urethra by congenital valves. Note the enlarged, distorted, and trabeculated bladder with diverticulum; ureteral reflux, hydro-ureter and hydronephrosis and the outline of the prostatic urethra ending abruptly at the valve. Symptoms: frequency, dysuria, pyuria, residual urine, a constantly palpable bladder. Relieved by punch operation on valves.

The bladder never completely empties itself and its distension may cause obvious enlargement of the abdomen. Enuresis is a constant symptom, and frequently is the reason for which the patient is brought for treatment. By the time these patients come for treatment, infection is usually established behind the obstruction, so that they present a picture very similar to that resulting from enlargement of the prostate. Examination shows an enlarged and trabeculated bladder, often with multiple diverticula; free reflux from bladder into ureter; enormous hydro-ureters and hydronephrosis. Kidney function is greatly impaired because of the prolonged back pressure. The cystogram provides the simplest and best aid to diagnosis. It outlines the enlarged and trabeculated bladder with diverticula, shows the reflux up the ureters and the hydro-ureters and hydronephrosis, and, finally, shows the shadow of the opaque solution filling the prostatic urethra and terminating abruptly at the valve (Figs. 2 and 3). At present, these patients are seen too late; gross renal damage has usually occurred. It is hoped that the discovery of this condition, which has resulted from the cystoscopy of children, will lead to earlier recognition of the characteristic symptoms, so that early relief of the obstruction may spare the kidney before too great damage has occurred. The valves are readily removed by a special small punch or by operation through the bladder.

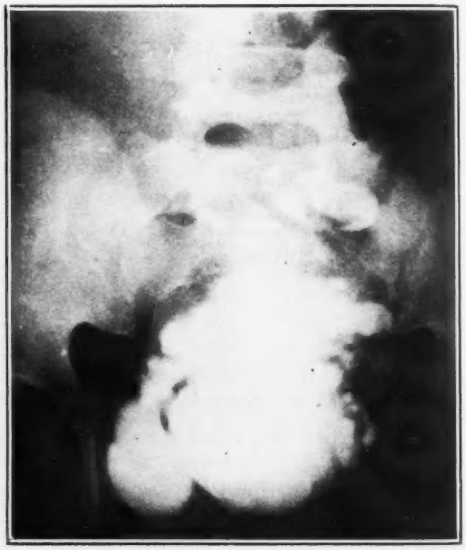

FIG. 3.—Cystogram in a case of obstruction of the prostatic urethra by congenital valves. Note the great trabeculation of the bladder and the numerous diverticula. Symptoms: frequency and dysuria from birth; more recently fever and a mass in right loin. This proved to be an enormous pyonephrosis. Death from uræmia.

FIG. 4—Cystogram from a case of stricture of the urethra secondary to plastic repair of hypospadias. Note the reflux up left ureter, the hydro-ureter and hydronephrosis. Symptoms: pain in left loin when he urinated. Cured by passage of sounds.

FIG. 5.—Pyelogram of a case of congenital stricture at the lower end of both ureters. Note the enormous hydro-ureter and hydronephrosis. This patient had also congenital valves in posterior urethra. Symptoms: bed wetting, frequency and constantly palpable bladder. Non protein nitrogen, 108. Death from uræmia.

Occasionally, stricture of the urethra is seen in male children. I have encountered one such case which followed successful repair of a partial hypospadias. After some years the operative scar contracted sufficiently to cause an obstruction with back pressure and hydronephrosis. Cure was obtained by dilatation of the stricture with sounds (Fig. 4).

Ureteral obstruction.—Ureteral obstructions not infrequently account for many cases of obscure abdominal pain. They occur in both sexes. The common sites are: (a) at the junction of the ureter with the bladder, in which case the obstruction is usually due to a congenital stenosis of the ureter (Figs. 5 and 6); and (b) at the junction of the ureter with the kidney pelvis, in which case the obstruction is most frequently due to looping of the ureter over an aberrant renal artery or to kinking of the ureter (Figs. 7 and 8). If no infection exists, these cases are rarely detected unless the hydro-ureter or hydronephrosis is sufficiently large to present a palpable tumour.

FIG. 6.—Congenital stricture of lower end of both ureters, enormous hydro-ureter and bilateral hydronephrosis. Symptoms: frequency and recurring attacks of fever and pyuria; diagnosed as chronic pyelitis. Greatly improved by plastic operation on the lower ends of the ureters.

FIG. 7.—Hydronephrosis in a boy of 15 months, due to kink in ureter at the uretero-pelvic junction. Symptoms: lump in abdomen. Cured by nephrectomy.

FIG. 8.—Hydronephrosis due to obstruction at the uretero-pelvic junction. Symptoms: constant pyuria, with recurring attacks of fever and increased pyuria.

FIG. 9.—Hydro-ureteral angularity. Note the ureter enormously increased in length and diameter. Symptoms: constant pyuria with recurring attacks of fever, diagnosed as chronic pyelitis. Female patient.

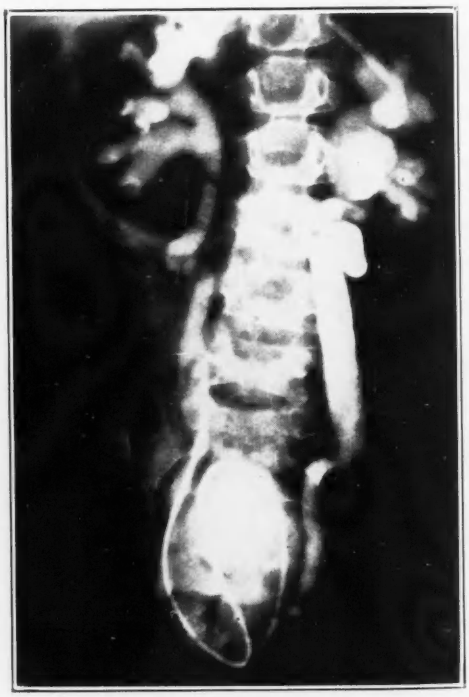

FIG. 10.—Hydro-ureteral angularity. Note the greatly enlarged ureter and hydronephrosis. Symptoms: constant pyuria with recurring attacks of fever. Diagnosed as chronic pyelitis. Greatly improved by lavage with argyrol. Female patient.

Usually it is infection with its characteristic symptoms, intermittent fever, chills, pain, and pyuria, which brings the patient for treatment. It is such cases as these which makes it wise to investigate every case of persistent pyuria in children.

There exists in children a curious ureteral lesion which apparently has no counterpart in adults. It is termed hydro-ureteral angularity.[1] The ureters are enormously dilated and increased in length, so that they lie in folds between the kidney and bladder. The kidney pelvis is dilated. The ureteral orifices are gaping so that urine regurgitates freely from the bladder up the ureters to the kidneys. The picture is similar to that produced by prolonged obstruction at the neck of the bladder, but this condition occurs in girls as well as in boys, and in none of the patients is there any evidence of difficulty in emptying the bladder. Vesical obstruction cannot be regarded as its cause. The probable basis is a congenital anomaly of development of the ureter which permits atonic dilatation of its lumen. Once the ureter has becomes angulated, the kinks of themselves cause obstruction and perpetuate the condition (Figs. 9 and 10).

FIG. 11.—Renal stone in the right half of a horse-shoe kidney.

RENAL STONE

It has long been recognized that renal stones may occasionally occur in childhood. This condition gives rise to such a characteristic set of symptoms (renal colic and hæmaturia) that the diagnosis is usually made from the history. The danger is that the history of pain will be misinterpreted as due to appendicitis or some other inflammatory lesion within the abdomen. If the possibility of renal stone is borne in mind, such mistakes are less likely. The type of pain is characteristic. It is peristaltic in nature, not constantly present but coming and going in spasms, and is of great severity. It is located along the line of kidney and ureter, the exact position being dependent upon the location of the stone. It radiates to the groin. Gastro-intestinal symptoms, particularly vomiting, are common. X-ray, cystoscopy, ureteral catheterization, and pyelography are valuable aids in diagnosis and treatment (Fig. 11).

RENAL TUBERCULOSIS

Tuberculosis of the kidney is more common in children than has been supposed. In the past it has not been detected, because of the absence of the usual symptoms: pain, urgency, fre-

FIG. 12.—Tuberculosis of the kidney.

quency, and hæmaturia. Routine investigation of the urine of all children suffering from bone and joint tuberculosis has revealed tubercle bacilli in 13 per cent of the specimens. For reasons which have been discussed in detail elsewhere,[2] we feel that the presence of tubercle bacilli in the urine indicates the presence of foci of tuberculosis in the kidney. This disease is one whose early development is still obscure. Much can be learned by the study of its manifestations in children. The kidney is infected from the blood stream at a time when heavy and progressive infection permits the escape of occasional tubercle bacilli into the blood. Implanted in the kidneys, the organisms produce many small tubercles. These usually progress slowly, and as long as the kidney only is involved give rise to no symptoms. In the course of time the disease extends to the bladder.

Involvement of the bladder gives rise to the symptoms (frequency and urgency) which in the ordinary course of events bring the patient for treatment. "Tuberculosis of the kidney" as we ordinarily use the term, therefore means "tuberculosis which commenced in the kidney, but which now involves the bladder also." The symptoms of tuberculosis of the kidney are bladder symptoms. During the stage of kidney involvement only there are no symptoms, and we may term this the silent phase of renal tuberculosis. This stage is apparently of long duration, many years in most cases. It can only be detected by the repeated examination of the urine of suspected patients. It is the silent phase of the disease which most commonly exists in children. This is illustrated by the following figures. During the ten years ending in December, 1926, there were admitted to the Hospital for Sick Children 396 patients suffering from bone and joint tuberculosis. Amongst these, only once was the diagnosis of renal tuberculosis made upon the basis of the usual symptoms. In the subsequent eighteen months, careful search of the urine revealed the presence of renal tuberculosis in 13 per cent of 67 cases. The importance of this observation lies in the fact that early recognition of the disease may offer some hope of cure by conservative measures. Though it is not yet capable of proof, there is some reason to believe that early and small renal lesions may heal under rest and heliotherapy. It is important, therefore, to make the examination of the urine part of the examination of every tuberculous child.

SUMMARY

We may summarize our experience with the new methods of investigating the urinary tract of children by saying that:

1. In general, children suffer from genito-urinary lesions which are similar in type to those of adults.

2. In many cases, accurate diagnosis can only be made by cystoscopy and pyelography.

3. Every case of persistent pyuria is deserving of thorough investigation, since this frequently permits the discovery of a mechanical and curable basis for the infection.

4. Certain cases of enuresis are not functional but are based upon organic defects.

5. Finally, the use of these methods has led to the discovery of certain lesions peculiar to children, such as hydro-ureteral angularity.

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TOBACCO SMOKING AND GASTRIC SYMPTOMS. — 1. Gray made a study of the relation of gastric symptoms to tobacco smoking in 400 individuals, who were divided into two groups. One group consisted of 300 patients who had functional gastric disturbance and gave a history of tobacco smoking, and the other of 100 patients with organic gastric disease who also gave a history of tobacco smoking. The ages in both groups ranged from 25 to 65 years, and there was a history of tobacco smoking for at least five-years. Of the entire group, 5 per cent were women in whom the gastric disturbance was of a functional nature. Most of the patients were cigarette smokers. About one-fifth smoked cigars only, some smoked cigar and cigarettes, and very few smoked pipes. Gray concludes that tobacco smoking is an etiological factor in gastric disturbances, but individual sensitivity rather than the amount of tobacco consumed is the determining factor in the symptomatology. The secretory and motor responses in individuals with gastric disturbances due to tobacco smoking vary in spite of similarity in clinical symptoms. About one-fourth of those patients with functional gastric disturbances attributable to tobacco smoking show hyperacidity, and about one-fifth subacidity. In peptic ulcer tobacco smoking usually causes an increase of gastric secretion during the fasting stage, and hyperacidity in about one-third. Clinical improvement in some of these patients with ulcer occurred only after cessation of smoking. The therapeutic test, and not the clinical and x-ray findings, determines the conclusion whether the person should smoke or not.—*Ann. Int. Med.*, p. 266, Sept. 1929.

TRAUMATIC RUPTURE OF THE URETHRA AND BLADDER*

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RUPTURES of the bladder and urethra are not uncommon occurrences. Though the diagnosis of these conditions is usually not difficult, there is frequently unnecessary and often serious delay in recognition of the condition and in the application of suitable treatment. It is possible that the frequency with which these injuries occur as a complication of fracture of the pelvis, the fracture being considered, unfortunately, the major injury, may account for some of this delay.

For a correct understanding of these conditions, an accurate knowledge of the anatomy of the parts is essential. By referring to the diagram

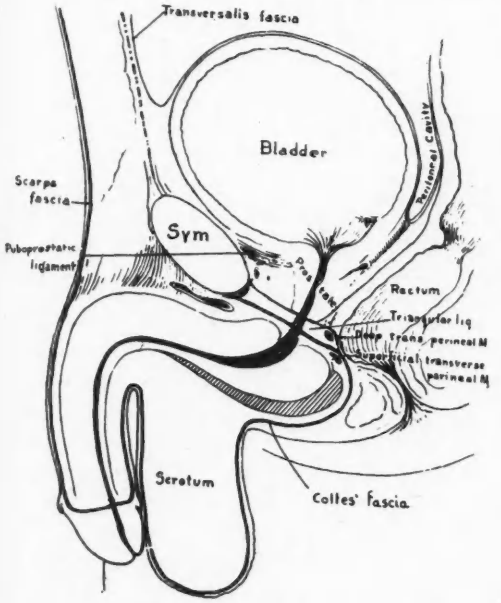

Diagram to show the relationships of Colles' fascia and the triangular ligament.

it will be seen that the two structures which do most to control the direction taken by extravasated blood and urine are the urogenital trigone and Colles' fascia The urogenital trigone, or triangular ligament, is a firm fascial structure which closes in the pubic arch, being attached on either side to the ischio-pubic ramus. It blends below with Colles' fascia. This latter, more superficial, fascial layer is also attached along the lower part of the ischio-pubic rami, but, anteriorly, spreads over the scrotum and penis to become continuous with the deep layer of the superficial fascia of the abdominal wall. Thus there is formed Colles' pouch, which is open above. Extravasation into this pouch is manifest by a swelling in the perineum, spreading anteriorly over the scrotum and penis and up over the abdominal wall. The extravasated fluid is prevented from spreading downwards on the thighs by the fusion of Scarpa's fascia with the deep fascia of the thigh, immediately below Poupart's ligament.

Rupture of the urethra may take place either in the bulbous urethra, that is anterior to the superficial layer of the urogenital trigone, or in the membranous urethra deep to this structure. In the latter case, the deep layer of the triangular ligament being a less dense structure than the anterior layer, forming the anterior wall of the ischio-rectal fossa and blending with the capsule of the prostate, the direction taken by the extravasated fluid is either to the ischio-rectal fossae or upwards to the pre-vesical space of Retzius.

Rupture of the bladder may occur in the lower anterior part of the organ and so be extra-peritoneal. This type of rupture most frequently is seen as a complication of a fractured pelvis with injury to the full bladder by a fragment of a fractured pubic arch. Intra-peritoneal rupture may also occur, usually as the result of a blow on the lower abdomen while the bladder is distended.

The diagnosis of rupture of the urethra presents no real difficulties. There is always a history of trauma, either in the form of a straddle injury, blow in the perineum, or injury of a type which would cause a fracture of the pelvis. Following such an injury, pain is complained of locally and along the urethra, and blood

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invariably appears at the meatus, independently of urination. Urination in such cases, however, is usually impossible. Signs of extravasation of blood and urine soon appear in the form of a painful swelling in the perineum or ischio-rectal region.

A diagnosis of rupture of the urethra having been made, it may not be a simple matter to determine the location of the injury. However, by considering the anatomy of the fascial layers which have already been reviewed, it will be seen that in rupture of the urethra in the bulbous portion, swelling will occur in the anterior portion of the perineum and extend forward within the limits of Colles' fascia. Such ruptures usually follow direct violence, whereas ruptures occurring in the membranous urethra are most commonly the result of a fracture of the pelvis. In this latter type of injury the tear in the urethra is caused by indirect violence—the urethra being fixed at it passes through the layers of the triangular ligament, which through their attachment to the ischio-pubic rami, are disturbed in their relationships to other soft parts, by fractures involving this portion of the pelvis. In rupture of the membranous urethra, the usual direction taken by the extravasation is backward through the less dense posterior layer of the triangular ligament, and, as I have already pointed out, finds its way into one or other ischio-rectal fossa or goes forward into the space of Retzius. In such an injury rectal examination will often yield valuable information. The fractured ischio-pubic ramus may be felt and the site of fracture located. Further, the extravasated blood and urine often pushes the prostate up so that it can barely be felt by the examining finger, beyond a boggy swelling over the deep urethra and in the lower rectum. In cases where complete rupture is suspected, it is inadvisable to use any exploring catheter or sound, where a diagnosis can be made without its use.

Rupture of the bladder may be extra-peritoneal or intra-peritoneal. In these cases, like those of rupture of the urethra, the history and physical findings are usually sufficiently definite that little or no difficulty is encountered in arriving at a correct diagnosis. The extra-peritoneal rupture is usually a complication of a fractured pelvis and is much more common when the injury takes place with the bladder full. In such an injury, a splinter of bone perforates the bladder. There is a history of injury following which the patient is unable to void urine, though there is a constant desire to do so. No blood is seen at the meatus. The absence of blood at the meatus and of any perineal swelling serve to differentiate a ruptured bladder from a ruptured urethra. If now a catheter is passed into the bladder it meets no obstruction, and a small quantity of bloody urine will be found in the bladder. Abdominal examination will reveal a suprapubic swelling which does not disappear on catheterization. On rectal examination, findings will be similar to those referred to in discussing rupture of the deep urethra, in most instances.

Intra-peritoneal rupture of the bladder usually results from a blow on the lower abdomen while the bladder is distended. A crushing injury may give the same results. Signs of shock are usually present. Pain is complained of in the lower abdomen, together with a persistent but ineffectual desire to urinate. As in extra-peritoneal rupture of the bladder, a catheter passes without obstruction, and a small amount of bloody urine is found in the bladder. If left untreated, signs of peritonitis soon appear.

Cystoscopy has no place in the diagnosis of ruptured bladder and is generally dangerous in such cases. The common practice of introducing a measured amount of an irrigating solution into the bladder through a catheter, and measuring the return flow, as an indication of leakage from the bladder, is most often unsatisfactory and misleading, and is mentioned only to be condemned.

The practice in treatment of rupture of the urethra does not seem to have been standardized. Many needlessly poor results have been and are still being obtained. The following method of treatment I have found to be most satisfactory.

The patient is prepared for both perineal section and suprapubic cystotomy, and, after being anæsthetized, is placed in the lithotomy position. A sound is then passed into the urethra to the site of the rupture, and held in place by an assistant. A mid-line perineal incision is made exposing the urethra at the point of rupture. The anterior or distal end of the torn urethra is easily identified by the sound which appears in the lumen. After controlling hæmorrhage, an attempt is made to locate the posterior or proximal end of the torn urethra. This is frequently a difficult matter. If it is accomplished easily, a catheter is passed into the urethra, replacing the sound, and is guided past the injury and on into the bladder. The urethra is then repaired around the catheter and

the wound loosely closed, the catheter being strapped in place and retained for seven to ten days.

Finding the posterior end of the urethra is not usually so simple a procedure, where trauma has destroyed the usual anatomical landmarks. I believe that too much time should not be spent in attempting to locate it, and, failing to locate it easily, one should proceed at once with a suprapubic cystotomy and retrograde catheterization. In this way the posterior end is quickly demonstrated and the perineal operation proceeded with as outlined above. In addition, more adequate drainage of the bladder is provided by drainage through the suprapubic cystotomy wound. This more perfect drainage does away with any seepage of urine along the catheter, to reach the torn area in the urethra, so lessening irritation and infection, and reducing the incidence of subsequent stricture formation.

In cases with rupture of the deep part of the membranous urethra, the rent may be at the apex of the prostate, the gland itself being pushed up by extravastated blood. Here it may be almost impossible to get the prostate down to meet the distal portion of the torn urethra. It must be remembered that the perineal position exaggerates this separation of the torn ends of the urethra, and a good result will be obtained if a catheter is guided across the gap into the bladder and the ends allowed to come together over it when the superficial wound has been closed and the horizontal position resumed.

After ten days the urethral catheter may be replaced by a fresh one and the suprapubic drain removed. The suprapubic incision will heal promptly, and in a few days the urethral catheter may be removed.

Steel bougies up to No. 26 French should be passed before the patient leaves hospital, and, particularly in injuries to the bulbous urethra, he should be instructed to return for further dilatation in three months, and afterwards, every six months. This is not so important in injuries to the membranous urethra, where the tendency to stricture formation is much less marked.

The treatment of extra-peritoneal rupture of the bladder consists in immediate suprapubic cystostomy, together with drainage of any areas infiltrated with extravasated blood and urine. In cases of intra-peritoneal rupture the peritoneum should first be opened and any urine wiped up as gently as possible. The opening in the bladder is then found and suitably sutured. The peritoneum is then closed, unless definite peritonitis has already developed, and a suprapubic cystostomy done to provide free bladder drainage.

The results obtained depend not only on suitable technique but also on the promptness with which it is employed. By following the procedures as outlined, and applying them promptly, we have had entirely satisfactory results. Our patients are followed for at least one to two years, and by the occasional passing of a sound stricture formation has been prevented.

The following three cases are reported in detail, as they illustrate the types of injury, the treatment, and the results.

CASE 1

P. A., aged 38, was admitted to St. Michael's Hospital in the late evening of August 8th, 1928. During the afternoon, while at work, he had fallen a distance of several feet astride the edge of an open barrel. There was immediate pain at the site of the injury in the perineum. He was unable to pass urine. On admission to hospital several hours later, a small amount of blood was trickling from the external meatus. The bladder was palpable suprapubically, and despite urgent desire to pass urine none was voided.

The perineum showed a rounded swelling at the base of the scrotum with a good deal of purple discolouration. A diagnosis of rupture of the bulbous urethra was made. The patient was taken to the operating room and prepared for both suprapubic and perineal operation. Ether was administered as an anæsthetic. The patient was then placed in the perineal position. A sound was passed down the site of the rupture of the urethra and cut down upon. There was a good deal of bruising of the adjoining parts, including the transverse perineal muscles which were lacerated. On account of the bruising and laceration it was very difficult to find the posterior end of the urethral tear. Consequently, a suprapubic cystotomy was done and a catheter passed retrograde. The proximal end of the urethra having been located in this manner, a catheter was passed through the urethra into the bladder. The rent in the urethra was repaired by three No. 0 catgut sutures. Suprapubic drainage was instituted and the perineum lightly closed.

Two weeks later, on August 21st, the suprapubic catheter was removed. The suprapubic wound immediately closed and on August 26th the urethral catheter was removed. The patient remained in hospital for four more days and was discharged on September 1st, 1928.

He has been seen regularly at intervals of three months. The urethra has remained patent. The patient was last seen on September 4th, one year after leaving hospital, and was in good health and passing a good stream of urine. On this occasion a No. 26 sound was passed without difficulty.

CASE 2

L. C., aged 24, was admitted to St. Michael's Hospital on January 28th, 1929. During the later part of the afternoon he had been crushed between a heavy motor truck and the loading platform of a warehouse. When seen first at 11.30 p.m. he was suffering considerable pain about the lower abdomen and upper part of the thighs. Despite an urgent desire to urinate he had been unable to do so.

Physical examination revealed definite evidence of fracture of the pelvis, which was confirmed by x-ray examination. There was definite constant bleeding at the meatus. In addition, a full bladder could be felt, extending about five centimetres above the level of the symphysis. There was definite perineal swelling. At

this time it was most prominent about three to four centimetres in front of the anus. Discolouration extended from the base of the scrotum back over the right ischio-rectal region.

A diagnosis of rupture of the urethra was made, and the patient was taken to the operating room and prepared for both a suprapubic and perineal operation. A sound was passed down to the level of the rupture of the urethra and appeared to enter a distinct cavity, but was obviously not in the bladder. A sound was cut down upon, the incision opening into Colles' pouch, which was found to be free from any extravasated urine. The tear was located just at the apex of the prostate, the prostate having been pushed well up by extravasated blood and urine.

On exploring the parts, after removing as much blood clot as possible, it was found that the extravasation had also pushed forward up through the puboprostatic ligaments toward the space of Retzius. Consequently, without further attempt to locate the posterior portion of the urethra, a suprapubic cystotomy was done. It was found that there was a great deal of extravasation of blood into the pre-vesical space. The bladder was exposed and opened. Retrograde catheterization was done and a catheter guided through the urethra from the meatus to the bladder. Separation of the two torn ends was so great that they could not be actually brought together. However, the perineal wound was loosely closed. The suprapubic wound was closed with drainage of the bladder and the pre-vesical space. Recovery was uneventful, except for a mild renal infection occurring on the seventh day. This was controlled by forcing fluids and the administration of alkalies. Suprapubic drainage was discontinued on February 22nd, and the urethral catheter removed on February 28th. The catheter and suprapubic drain were left in rather longer than usual on account of the amount of tissue damage in both the pre-vesical space and the perineum. He remained in bed and in hospital on account of the fracture of the pelvis until the third week of April. He was allowed to go home on April 24th, 1929. He has been seen regularly since and is having no difficulty in passing urine, a No. 26 sound passing without difficulty into the bladder.

CASE 3

H. P., aged 31, admitted to St. Michael's Hospital on March 1st, 1929. Seventy-two hours previously while felling a tree, he was caught under the trunk of the tree as it fell. The accident occurred during the middle of the forenoon. He had not voided since arising early in the morning. Consequently, the bladder was full. He had a constant desire to pass urine but none could be passed. His physician, some twelve hours previously, had passed a catheter and obtained four ounces of bloody urine. On admission, there was ecchymosis, extending from the level of the umbilicus on the right side to the juncture of the upper middle third on the thigh. Discolouration and swelling crossed well over to the left side of the mid line and extended fairly well around on the right flank. A catheter was passed and approximately four ounces of bloody urine was obtained. A measured amount of sterile water was injected into the bladder and returned without loss. On account of this misleading evidence, delay took place until the following day in operating on this patient, when he was taken to the operating room and emergency preparation for suprapubic drainage made. Immediately on cutting through the skin, bloody fluid was encountered. On extending the incision through the muscle, the protruding end of the fractured right ramus of the pubes could be felt. From this the examining finger passed directly through the rent into the bladder. A large drainage tube was placed in the bladder and the patient returned to bed. Two thousand cubic centimetres of interstitial saline was given and the patient's condition improved materially. One week later the parts which had shown marked ecchymosis appeared to be normal, except in three areas, one over Poupart's ligament, and two over the lower right quadrant of the abdomen, where areas of skin slough occurred. This slough was cleared away and the base kept clear with saline dressings.

On March 18th, suprapubic drainage was discontinued and an indwelling catheter inserted. The suprapubic wound closed immediately. On March 24th, all the tubes were removed and the patient was passing urine naturally. From then on convalescence was uneventful, except for neuritis of the seventh cranial nerve, which manifested itself for a few days and quickly disappeared. The patient remained in hospital until June 26th on account of the fracture of the pelvis. He has not been seen since, but his family physician reports that he is enjoying good health.

SUCTION DRAINAGE IN EMPYEMA

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MOST cases of empyema are satisfactorily treated by dependent open drainage, and after a variable period, sometimes of several months, they are cured. Other cases similarly treated fail to clear up and remind us that empyema may be a very disabling and serious condition. Suction drainage has been sporadically used for many years but has never become generally popular. Theoretically, this treatment is sound, but practically it has been largely discarded because of the difficulty of obtaining a satisfactory air-tight union between the apparatus and the chest wall. The apparatus to be described was constructed to treat a case with a very large cavity which promised to remain large and to become chronic. The results of suction were surprisingly good. It was used in other tedious cases with such success that now it is used by the author as a routine. The period of suction drainage required to complete the closure of the empyema cavity has been from two to three weeks in the average acute case where suction has been applied immediately after rib resection. Five weeks was required in one case of virulent streptococcic infection, but in this case suction was interrupted for one week because of an abscess in the chest wall. The most striking result was obtained in case No. 10 with a com-

plete collapse of the lung which was first treated by open drainage. After two weeks' suction drainage the lung was expanded and adherent to the parietal pleura up to the drainage tube. Case No. 8, a chronic case of eight months' duration, was cured with sixteen days' suction drainage. Several of the cases reported had been treated by open drainage for periods up to one month with indifferent results, but they all cleared up promptly with suction.

The following advantages are claimed for suction drainage.

1. The period of morbidity is greatly shortened.
2. The acute cases are cleared up by its use and none drift into the lingering chronic stage.
3. Chronic cases are cured, unless the lung is fibrotic and fixed.
4. In debilitated patients it is life saving.
5. The patient is very comfortable during the period of treatment and is not confined to bed.
6. Dressings are less frequent and are no more troublesome than when open drainage is used.

There are two distinct processes to be dealt with in curing an empyema; firstly the clearing up of the infection, and, secondly, the expansion of the collapsed lung. The clearing up of the infection is the more important and the usual cause of delay in curing an empyema is the persistence of the infection rather than the failure of the lung to expand. This is sometimes demonstrated by the rapid improvement which occurs in a tedious case following the use of an antiseptic solution such as Dakin's. Many patients require something more positive than drainage to clear up the infection; the constant absorption of toxins from the large purulent cavity is more than they can combat, and they do badly. The expansion of the lung is a mechanical process. After the usual rib resection and insertion of a drainage tube, the opening in the chest wall becomes quite small in a few days, much smaller in area than the interior of the glottis. It is also covered with dressings which are usually pus-soaked and tend to seal the opening. Consequently, with each inspiration much more air is drawn through the air passages into the lung than finds its way through the opening in the chest wall into the empyema cavity. The result is that the lung tends to expand a little with each inspiration. An ever-increasing area of visceral pleura comes into contact with the chest wall, and as the infection clears up and the production of purulent discharge ceases, adhesions form at the circumference of the empyema cavity between lung and chest wall gradually lessening it, until the cavity is obliterated. But the infection may not clear up for various reasons and the adhesions mentioned may not form, while the surface of the lung becomes covered with a thick layer of organized lymph, anchoring it down in its contracted condition. In such a case the curative process is greatly delayed and may fail altogether.

In suction drainage we have an agent which assists very materially in clearing up the infection and in expanding the lung. A percentage of air is withdrawn from the empyema cavity, leaving a partial vacuum there. The vacuum produces a hyperæmia. The blood vessels in the walls of the cavity become dilated and engorged with blood and a flow of serum is promoted through their walls and into the empyema cavity. This serum provides the positive antiseptic agent required to overcome the infection. It bathes the cells of the entire affected area and eventually collects in the empyema cavity carrying dead bacteria and toxins with it. A condition is produced formerly much used in treating infections, the well known Bier's hyperæmia. The multiplication of bacteria is lessened, the absorption of toxins is diminished, the fever is reduced; in short, the infection is cleared up. The expansion of the collapsed lung begins at the same time. The partial vacuum developed in the cavity produces a gentle pull on the lung towards the cavity. The respiratory movements assist the process and the lung rapidly expands. Adhesions soon form to hold it in the expanded position to the chest wall. Practically it is found that no disturbance whatever occurs when the apparatus is removed daily for cleansing.

The apparatus consists of a 16-ounce bottle with a large neck, in which a partial vacuum is produced by exhausting some of the contained air. This bottle is connected to the chest by a drainage tube which in turn exhausts some of the air from the empyema cavity and withdraws the purulent discharge into the bottle. The apparatus is attached to the chest wall without the use of any adhesive substance, as this soon irritates the skin and also prevents the frequent removal of the apparatus. An

air-tight union is made by a piece of pure sheet rubber, five by eight inches, through the centre of which the drainage tube passes. The sheet rubber lies over the thoracotomy opening and is held tight against the chest wall by tapes which are fastened around the patient's chest. Over this is placed a pad and binder. The rubber is not irritating to the raw areas, is easily removed for cleaning and it holds the vacuum in the chest perfectly. Automobile "inner tube" sheet rubber is the best obtainable for the purpose. The drainage tube is of good quality quarter-inch rubber tubing about sixteen inches long. The inner end is carried through the centre of the sheet rubber, and projects three inches beyond it, long enough to reach well into the empyema cavity. There must be an air-tight union at the point where the drainage tube penetrates the sheet rubber. This is made by first shoving a half-inch length of glass tubing into the lumen of the drainage tube to the point where it penetrates the sheet rubber. A very small hole is made through the centre of the sheet rubber, the end of an artery forcep is shoved through this hole and is clamped to the end of the drainage tube. The drainage tube is then drawn through the hole in the sheet rubber until the glass tubing within it is grasped by the edges of the hole. The edges of the hole lie as a narrow collar along the drainage tube and this collar is tightly bound with strong silk to the drainage tube, the glass tubing inside keeping the lumen patent. The tie is made on the side of the rubber sheet away from the chest wall. A vulcanized joint is much neater, but is not yet always available.

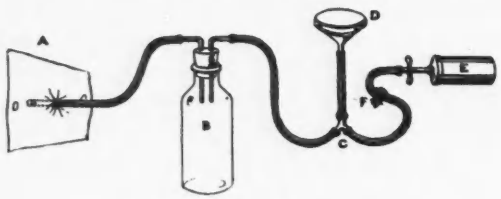

FIG. 1.—Suction apparatus.

A. Sheet rubber with holes punched in sides for tapes. Drainage tube penetrates its centre.

B. Wash bottle in which a partial vacuum is produced and which collects the discharge.

C. T-tube which unites manometer with the rubber tubing.

D. Manometer made of a small funnel having a cylindrical top; thin sheet rubber across top.

E. Small vacuum pump. An "Asepto" syringe may be used instead to produce the vacuum.

F. Clamp on outer end of rubber tubing.

The wash bottle, of about one pint capacity, is stoppered by a rubber cork with two perforations through which short glass tubes are run. To one glass tube is attached the outer end of the drainage tube and to the other is attached a second length of quarter-inch rubber tubing one foot long. A clamp or an artery forcep is provided to clamp the outer end of this tube when the apparatus is in use. This tube is cut across at its centre and the cut ends are connected by a T-shaped glass connecting tube. To the stem of this T-tube a manometer is attached. The manometer may be made of a small funnel which has a cylindrical section at the large end of the funnel. A piece of thin sheet rubber, such as soft rubber drainage tubing, is placed over the mouth of the funnel and is tied firmly around the funnel with silk thread. The funnel is connected to the stem of the T-tube by a short rubber tube. The manometer is an essential part of the apparatus as the movements of its rubber diaphragm follow the respiratory movements when the apparatus is in use, and also indicate the amount of suction in use. Leaks in the apparatus, or plugging of the drainage tube with masses of fibrin, are at once shown.

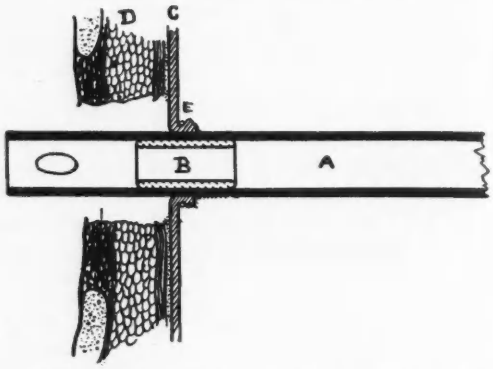

FIG. 2.—Air-tight closure of thoracotomy opening.

A. Section of drainage tube; fenestrum at inner end.

B. Section of glass tube inserted in drainage tube at point where it penetrates sheet rubber.

C. Section of sheet rubber as it lies against skin of patient.

D. Section of chest wall with drainage tube lying in thoracotomy opening.

E. Narrow collar of sheet rubber lying along the drainage tube and tied to it with silk thread.

Before being applied the apparatus is tested

for leaks by connecting the various parts, clamping the inner end of the drainage tube, immersing all joints under water and blowing into the outer end of the tubing. A stream of bubbles indicates a leak. A leaking apparatus is a constant annoyance and is worse than useless.

The apparatus is applied as soon after rib resection as is convenient. A thick layer of sterile zinc oxide ointment is first smeared around the thoracotomy opening. It serves the double purpose of preventing leaks under the rubber sheet and of being soothing to the patient's skin. The drainage tube with sheet rubber attached has been sterilized by boiling and is inserted into the opening. The sheet rubber is fastened snugly to the skin by a tape or length of gauze bandage tied through a small hole in each end in line with the drainage tube, and tied around the patient's chest tightly enough to stretch the rubber slightly. Long narrow pads are placed next the skin under the tapes to prevent chafing. The outer end of the drainage tube is threaded through the centre of one or more thick pads of absorbent cotton. A many-tailed binder is applied snugly over all. This type of binder is much the best as it ensures an even pressure over the pad and the sheet rubber while the drainage tube comes out between the tails The wash bottle and manometer are now connected with the drainage tube and suction is applied.

Suction is obtained by exhausting some of the air in the wash bottle with some small suction pump. The most convenient article in hospital is the ordinary small "Asepto" syringe with glass barrel and rubber bulb, commonly used for dressings. The bulb is compressed, the tip is inserted into the outer end of the rubber tube and on releasing the bulb, air is exhausted. Three or four withdrawals are sufficient and the rubber tube is then clamped. Very little suction is required; too much causes pain. The rubber diaphragm of the manometer is drawn inwards and moves with respiration. It is well to have a glass connecting tube in the drainage tube between the wash bottle and the chest wall, for discharge is at once drawn from the chest and is seen in the connecting tube. It moves to-and-fro with respiration, and should it become stationary some blockage in the drainage tube is indicated. The patient is quite comfortable. Orders are left to withdraw more air if needed, every two hours. It is admitted that the degree of vacuum produced in the empyema cavity varies considerably, for the vacuum gradually lessens but this is probably an advantage. When using Bier's hyperæmia the treatment was always given intermittently.

The apparatus is removed daily, and the empyema cavity is irrigated with Dakin's solution, introduced through a catheter. In addition to being antiseptic, the solution helps to dissolve any masses of fibrin present. Should the drainage tube get plugged with these masses, or become displaced, it requires removal and adjustment at other times. The interference with suction is shown by the rubber diaphragm of the manometer. With the drainage tube plugged it remains depressed but does not move with respiration; should a leak occur it becomes flat. When the patient is able to leave his bed the bottle is slung from his neck with a tape and he moves about at will.

The size of the cavity is demonstrated by filling it with solution. It lessens in size rapidly while the discharge changes to a thin blood-tinged sero-pus and later to serum. When nothing is left of the cavity but the sinus which holds the drainage tube and the discharge consists of about one dram of blood tinged serum daily, the apparatus is removed and the sinus is filled with a 10 per cent bismuth paste. This is introduced hot through a warmed catheter which is put down to the bottom of the sinus and gradually withdrawn as the paste is injected. One injection will close the sinus.

Several points may be mentioned in more detail.

Leaks.—After the apparatus is applied and the air exhausted it may happen that the diaphragm of the manometer flattens out in a few minutes. The whole apparatus should be removed and again tested for leaks under water. A leak may occur between the sheet rubber and the chest wall if the rubber sheet is not tightly applied. When the thoracotomy opening is near the angle of the scapula in a thin patient, movements of the scapula may cause a leak. An extra pad and a tighter binder will

correct it. The joint between the drainage tube and the sheet rubber may become loosened after frequent boiling or excessive pulling and a leak will result.

Pain.—There should be no pain. Excessive suction will cause pain but the usual cause of pain is a faulty application, allowing the drainage tube to press against one side or other of the thoracotomy opening. When tying the tapes around the patient's chest, lying in bed, the posterior tape is first drawn taut with the drainage tube in place and when the tapes are tied the tube must lie in the centre of the chest opening. New tapes are used at each dressing.

Discharge.—The daily amount of discharge will be from two to four ounces when drainage is commenced. A scanty discharge usually means that the drainage tube is not long enough to reach into the pleural cavity and is withdrawing only a little bloody serum from the chest wall. Movements of the patient may partly withdraw the tube if too loosely applied, with the same result. The discharge becomes thin and less purulent as an outflow of serum is established and when the infection has cleared up it is clear and blood-tinged.

Rib resection.—All the cases reported here had rib resection performed, as it has obvious advantages. An intercostal opening will provide all the drainage necessary when using suction drainage, but it has two disadvantages. Large masses of coagulated lymph are present in some cases which cannot be removed without rib resection, and these cause trouble by blocking the drainage tube. Changing the drainage tube at dressings through a tight opening is both difficult and painful to the patient. It would be necessary to keep the intercostal opening sufficiently large to allow the drainage tube to pass through it easily.

Bronchial fistula.—Several cases are reported which were complicated by bronchial fistula. Dakin's solution injected into the cavity caused violent coughing and the patient tasted the solution. Suction acts surprisingly well in these cases and is indicated. It would appear that the suction draws lung tissue into the fistulous opening in the visceral pleura of the lung, and acts as a valve preventing any leakage of air from the lung.

Chronic empyema.—Cases first seen one or two months after rib resection did well with suction drainage. Case 9, of one month duration after rib resection, had a very small cavity remaining after four weeks' suction. The cavity was sterile and dried up after an injection of bismuth paste. Case 8, of 8 months' duration, cleared up after 16 days suction. Case 12, of 14 years' duration, had a very fibrotic lung. Suction had the effect of diminishing the size of the cavity. The suction produces a hyperæmia of the thickened pleura which becomes softened and then gradually stretches, allowing the lung to expand. Where the lung is fibrotic, however, suction drainage will not succeed in expanding it.

Several of the cases reported below were reported in a previous article in the *Canadian Medical Association Journal,* **16**: 534, 1926. The case histories are not given in detail, except where the effects of suction drainage are shown.

CASE 1

A boy aged 12 years with a history of lobar pneumonia. When seen he had dullness of the right chest extending up to the clavicle. His temperature was 104°. The aspirated pus contained pneumococci. Rib resection opened a large cavity containing thin pus and tremendous masses of coagulated lymph. Suction drainage was commenced on the following day, but was not satisfactory for two days, when it was discovered that movements of the patient partially withdrew the drainage tube from the pleural cavity until its end rested amongst the muscles of the chest wall. Bloody serum only was collected. A longer tube being used, good drainage was obtained. The tube became repeatedly blocked with coagulated lymph in spite of daily irrigations with Dakin's solution. On the fifth and sixth days after operation a caroid mixture was injected into the cavity. This rapidly dissolved the masses. On the twelfth day the patient was sitting up in a chair. On the nineteenth day a sinus only remained, which was filled with bismuth paste. On the twenty-third day after operation he was discharged from hospital, cured.

CASE 2

A male aged 38, giving a history of right-sided pneumonia, with a climbing temperature after the crisis. X-ray examination showed fluid extending as high as the clavicle on the lateral chest wall. The aspirated fluid contained pneumococci and streptococci. At rib resection one pint of thin pus was evacuated. Suction was started two days later. In five days the patient was up in a chair; in twelve days the cavity had disappeared and the sinus was filled with bismuth paste; in eighteen days after operation the patient left the hospital, cured.

CASE 3

A female, aged 30, in whom empyema followed lobar pneumonia. After rib resection open drainage was used for ten days, but the patient did badly, had a profuse discharge, evening pyrexia, pain in the chest, etc. Suction drainage was then commenced, but leaks in the apparatus caused trouble for several days. After repairs had been made, the condition rapidly improved and three weeks after suction was commenced the cavity was gone. The sinus was injected with bismuth paste and promptly closed.

CASE 4

A male, aged 30, a drug addict, had pneumonia followed by empyema, the infection being pneumococci and streptococci. After rib resection open drainage was used for six days, with daily irrigations with Dakin's solution. The patient did badly, had a bad cough, pain in the chest, and a temperature of 101°. Suction drainage was then commenced with rapid improvement. In two weeks a sinus only remained, which promptly closed after an injection of bismuth paste.

CASE 5

A male, aged 38. This patient developed a lobar pneumonia with pleural effusion and he was very ill. On the tenth day aspiration obtained ten ounces of thin foul smelling pus which contained streptococci and staphylococci. Rib resection disclosed a small cavity containing about twelve ounces of foul-smelling pus. The walls of the cavity were covered with a shaggy adherent membrane. Suction drainage was commenced at once with daily irrigations of Dakin's solution. Improvement was slow for one week. There was a profuse discharge of pus, the odour gradually lessening, and a temperature up to 99.3.° Improvement was then more rapid, but suction had to be stopped on the sixteenth day when the cavity held only three ounces, because an abscess developed in the chest wall near the thoracotomy opening. This was drained through a new opening, and on the twenty-fourth day suction was started again. The cavity then held four ounces. The patient was allowed up in a chair. On the thirty-first day suction was stopped and the sinus was injected with bismuth paste. The abscess was still discharging. On the thirty-sixth day after rib resection the patient was discharged cured. This case had the most virulent infection of the series.

CASE 6

A female, aged 55, in whom empyema followed excision of an osteomyelitic rib. There were no limiting adhesions and the whole pleural cavity was involved, a very different condition from the usual case where the lung is adherent to the chest wall surrounding a collection of pus. The patient was in a very precarious condition, and the prognosis was bad until suction drainage was commenced, four days after the excision of the rib. Drainage was carried on through the original incision in the anterior axillary line, and, in spite of the bad position of this opening, improvement was rapid. After 18 days of suction drainage the infection had cleared up and the sinus was injected with bismuth paste, closing promptly.

CASE 7

A male, aged 37, seen with influenza. He gave a history of pneumonia five years previously, followed by empyema which cleared up slowly after rib resection and drainage. Each winter afterwards he developed a cough, with severe pain in the side at the site of the old empyema. Soon afterwards, large quantities of purulent matter were coughed up and he gradually improved. The last attack had lasted two months and left him very weak. The history suggested a chronic empyema draining through a fistulous opening into the lung. This history repeated itself. He developed a high temperature, pain in the side, and he coughed up much purulent sputum. Six days after the onset the old empyema was opened and a narrow track found filled with pus. A drainage tube was inserted. He then coughed up considerable blood, in addition to purulent matter, and his temperature remained elevated. A bronchial fistula was undoubtedly present. Suction drainage was started four days after operation and was efficient. No air leaked into the cavity from the lung. Improvement was rapid; cough and pyrexia disappeared. On the third day after the commencement of suction drainage he was out of bed. On the eleventh day he left hospital with the suction apparatus attached, and then reported daily at my office for dressings. One week afterwards the sinus was injected with bismuth paste and promptly closed. While in hospital an attempt was made to irrigate the cavity with Dakin's solution, but it caused violent coughing. When the bismuth paste was injected he complained of tasting it. It would appear that the bronchial fistula remained open to the end of treatment. He has remained well now for 18 months.

CASE 8

A female, aged 12, with a history of pneumonia followed by empyema eight months previously. Rib resection had been performed on seventh rib in the anterior axillary line. The sinus was still discharging; the child was thin and anæmic, had an evening pyrexia and a bad cough. The sinus was enlarged and a globular cavity holding six ounces was found. Open drainage was carried on for one week, but the cough persisted and the temperature ranged from 101° to 103.° Suction drainage was then commenced and caused some reaction for several days. Four days after the commencement of suction the temperature was 103.° Improvement was then rapid and in one week more a sinus only remained, and the discharge was blood-tinged serum. Sixteen days after the commencement of suction the sinus was injected with bismuth paste and promptly closed. The child is well, one year later.

Poor drainage may have been responsible for this case, but the suction drainage was applied through the same opening and gave a striking demonstration of its value.

CASE 9

A boy, aged 8, entered the hospital with influenzal pneumonia; had very high temperature, was unconscious for five days, and was given oxygen constantly. On the sixth day aspiration of the right chest revealed thin pus. Aspiration was repeatedly done and on the fifteenth day rib resection was done, and open drainage started. He improved slowly for three weeks, and then came to a standstill, being very weak, running an irregular temperature and having considerable discharge from the chest. After a total of one month of this treatment examination showed a cavity holding two ounces, which discharged thin pus. The right chest was very flat and showed practically no movement with respiration. His temperature ran about 100.° Suction drainage was then commenced. The temperature curve became flatter, the discharge was increased and more serous, and in two weeks the general condition was much improved. The patient was allowed up, wearing the apparatus. In another week x-ray examination showed a greatly diminished right pleural cavity with high diaphragm and a small triangular cavity. This cavity held one dram of fluid. Suction was continued another week, but the cavity did not disappear. The discharge was scanty blood-tinged serum, and, as the general condition of the patient was good, the suction was stopped and the cavity injected with bismuth paste. It at once dried up and the patient was discharged from hospital four days later. Four months after discharge he is well and has fair expansion of the right chest.

CASE 10

A boy, aged 7, entered hospital in diabetic coma. During convalescence in the hospital a left-sided empyema developed on which a rib resection with open drainage was done. An x-ray examination made two

weeks later showed a complete collapse of the left lung, with marked displacement of the heart and mediastinum. Suction drainage was commenced. X-ray report one week later showed a greatly enlarged lung shadow, but the heart was still displaced. Two weeks after the commencement of suction drainage the x-ray department reported the heart more in the normal position and the lung still more expanded. At this time, clinically, the lung was adherent to the chest wall, leaving only a sinus remaining, which held the drainage tube and which was filled with one dram of fluid. Suction was continued another week without any apparent change, and then stopped. The patient was kept in hospital three weeks longer because of his diabetes. No bismuth paste was used, but the sinus dried up and closed. Three months later the patient is doing well. This case would most probably have become chronic if the usual open drainage had been carried out, with the prospect of a life of chronic invalidism.

FIG. 3. *Case 10.*—Left sided empyema. Plate taken two weeks after rib resection. Heart and mediastinum displaced to right. Shadow of right lung is clear. Shadow of left lung is absent showing complete collapse of lung.

CASE 11

A male, aged 33 years, had been in hospital for five weeks for treatment of empyema. Rib resection had been done on the 7th rib in the anterior axillary line, followed by another resection of the 3rd rib, to open a second collection of pus. The patient was doing badly, running an irregular temperature. On examination the upper sinus was found to lead to a small cavity over the upper left lobe, while the lower sinus was a track six inches long, passing posteriorly around the lung. X-ray examination showed the upper lobe clear, but there was an area of density laterally and behind the lower lobe. Suction drainage was applied to the lower sinus, but the discharge was scanty, indicating poor drainage, and the patient did not improve. Aspiration revealed a collection of pus behind the lower lobe and a third resection was performed on the 8th rib near the angle of the scapula. This opened a large cavity. Suction drainage was then applied to this cavity and to the cavity over the upper lobe which was pocketing. The drainage tubes from the two cavities were united by a Y-tube, which was in turn connected to the wash bottle. The patient at once improved and was allowed out of bed. The two cavities rapidly diminished in size and the discharge became serous. Three weeks after the commencement of suction drainage the upper sinus was filled with bismuth paste and at once dried up. Two weeks later the posterior sinus was similarly treated and at once dried up. The patient was discharged four days later. The long sinus drained during this period, and a bronchial fistula developed, probably due to pressure of the rubber drainage tube against the pleura. It continued to drain for one month after the patient left the hospital. Five months after leaving the hospital the patient is in good health.

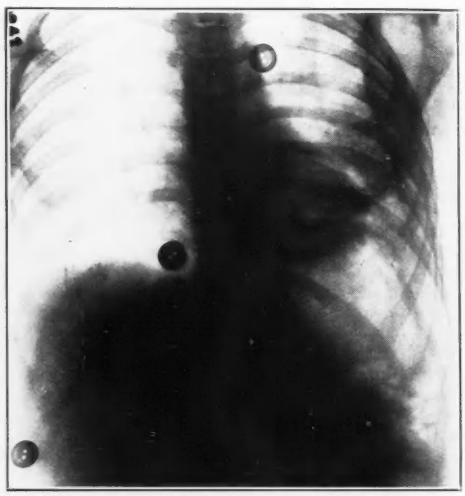

FIG. 4. *Case 10.*—Taken before discharge from hospital. Left lung well expanded.

CASE 12

A male, aged 47 years, with a history of pneumonia followed by empyema fourteen years previously. Rib resection had been performed near the angle of the scapula, but the empyema had never cleared up. Several operations had been done and portions of several ribs had been removed, but the thoracoplasty was very incomplete and had done no good. The patient was in bad condition, and suction drainage was commenced in an attempt to clear up the infection and improve his general condition, preparatory to a thoracoplasty. X-ray examination, using lipiodol, showed a cavity extending posteriorly as high as the clavicle and also demonstrated a bronchial fistula. The results of suction drainage were interesting. In spite of the bronchial fistula the suction worked perfectly. The discharge, which was very foul, increased in quantity and the odour improved. The cavity decreased to one-half its original size,, and after two weeks it was possible to irrigate it with Dakin's solution without the violent coughing which was caused at first. Suction drainage was continued for one month, but the patient continued very weak and he was discharged without thoracoplasty.

A METHOD OF TRANSCERVICAL DRAINAGE IN PURULENT INFECTIONS OF THE PELVIS REQUIRING SUPRAVAGINAL HYSTERECTOMY*

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Montreal

FOR upwards of four years we have been practising transcervical drainage in our hysterectomies for purulent infections of the pelvis (inflammations of the adnexa, pelvic abscesses, pelvic peritonitis, etc.) without being aware that Jean Louis Faure and Howard Kelly had recommended it long before us, though without describing it in detail, or having reported a case, so far at least as we can judge from the literature we have consulted Guided by our master, colleague, and friend, Associate Professor R. Trudeau, who, so far as we know, was the first to lay down clean-cut principles and to indicate the exact technique of this particular method of drainage, we shall endeavour here to explain its advantages.

It was in the gynæcological service of the Notre Dame Hospital, under the direction of Prof. L. de L. Harwood, that Professor Trudeau first attempted transcervical or transcervico-vaginal drainage. After a difficult operation for bilateral, suppurative, and adhesive inflammation of the adnexa, where a sub-total hysterectomy was imperative, we came upon a lower pelvis, with oozing blood, and containing pathological exudations, into which had been discharged the contents of two enormous Fallopian tubes filled with pus. Draining was urgent. To establish free drainage through the abdominal wall was to risk the possibility of eventration and the production of a troublesome fistula in a woman with poor tissues and weakened by prolonged suppuration. Drainage by perforating the Douglas' sac did not appeal to the operator. Professor Trudeau then conceived the plan of instituting drainage by incising the posterior lip of the *cervix uteri*. So far did the result exceed our expectations that from that time forward we have adopted the procedure as routine in all such cases.

To recommend a method of drainage at a time when the tendency is to eliminate it from operative technique more and more would seem to be out of date. Nevertheless, it is a fact that certain cases of pelvic suppuration demand some kind of drainage to permit the evacuation of fluids that have accumulated in the abdomen. When certain pathological conditions justify sub-total hysterectomy and necessitate drainage Professor Trudeau therefore recommends the following technique for transcervical or transcervico-vaginal drainage.

As soon as hysterectomy at the isthmus is completed the cervix is cleansed as completely as possible, as in every supravaginal hysterectomy. For some days previous to operation the vagina is prepared for drainage by means of antiseptic douches, and immediately before operation the vaginal wall is swabbed with tincture of iodine. The right and left sides of the cervix are seized with Museux forceps, all ready for the incision, being careful to avoid injuring the uterine arteries. The cervix being thus firmly fixed, its position is ascertained by means of a uterine sound. Then, after dilating the cervix with the half-opened forceps, its posterior lip is incised to its vaginal end with straight scissors that are guarded. The use of scissors with pointed ends is dangerous as there is a risk of perforating the vagina or rectum. The incision should be deep and complete, allowing of the introduction of the index finger into the cervical canal as far as the vagina (See Fig. 1). A T-shaped fenestrated drain, in which a short portion, half a centimetre in diameter, is attached transversely to a long one, one and a half centimetres in diameter, by means of a silk thread, is then seized by its free end and pushed through the cervix into the vagina. An assistant, having introduced his hand into the vagina as far as the field of operation, takes hold of it and directs it according to the wish of the operator. Care should be taken not to allow any play of the drain which should be gripped by the stump of the cervix (See Fig. 2). One obtains

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then an oozing cavity, deprived of its peritoneal coat, containing pathological exudates, and with infiltrated tissues which do not allow of its being covered again with peritoneum. A careful toilet of this cavity is instituted and it is disinfected as well as possible. The use of ether for this operation has given us complete satisfaction.

In order to limit the possible area of infection and to avoid the formation of epiploic and intestinal adhesions to the freshened raw surface, the next stage of the operative procedure is highly important, *viz.*, the closing off of the cavity by means of the iliac "S". By this means almost complete isolation of the cavity is obtained; somewhere on the right side there exists a canal sufficiently large to permit of the discharge of the secretions and fluids which may collect, and in fact always do collect, in the peritoneal cavity when the intervention requires the use of the Trendelenberg position for a long time; these fluids will eventually be evacuated by the transcervical drain. In cases where the appendix is involved and must be removed, and they are frequent, this drainage canal will, as a rule, relieve the operator of all worry when he is compelled to drain in a case of acute or subacute appendicitis.

The abdominal incision is then closed without drainage, after having taken care to change the gloves and instruments. We have sometimes doubted the efficiency of transcervical drainage in cases where the lesions were acute and a gangrenous appendicitis had been superadded to the pelvic lesion. A cigarette drain or a tube through which aspiration could be performed was introduced through the abdominal wound. Always, at the end of forty-eight hours, we removed the drain for the reason that no discharge came away from it. The vaginal drain was sufficient for the need.

FIG. 1.—The dotted line shows the place of incision on the cervical stump.

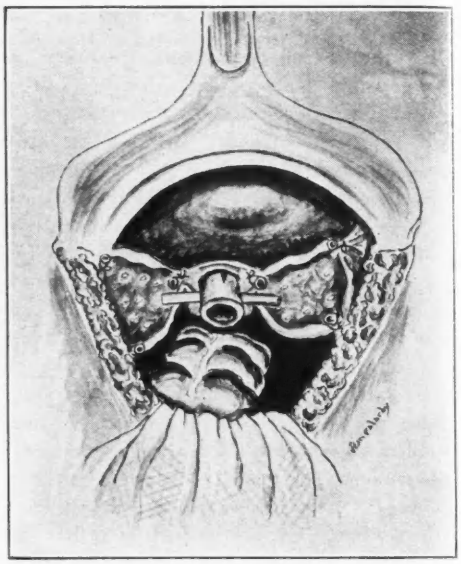

FIG. 2.—The drainage T-tube in place.

The local post-operative care in cases drained in this manner bulks large in the satisfactory outcome. We say nothing of the general post-operative measures, the consideration of which need not take up our time; every surgeon has his own preference as to the means necessary to recover his patient and bring her through the shock of the operation. The same cannot be said of the local measures, which, we think, should be very rigorously carried out. When we first employed this method of drainage we frequently used to be called by the nurse or the interne because the patient operated on that morning was having a hæmorrhage. The vaginal dressing, saturated with blood, naturally led to this conclusion. The slow, full, strong pulse, however, was enough to remove all fear. The reason is that the drain, placed at the lowest point, permits of the evacuation of a considerable quantity of the collected fluid, particularly when the patient has been placed in the half-sitting, or Fowler, position. Those in charge should be warned that this kind of drainage necessitates

the frequent renewal of the external vaginal dressing, and should be informed that the fullness, regularity, and strength of the pulse will exclude the possibility of hæmorrhage. At the end of forty-eight hours the compresses should be changed, being as careful as possible to avoid ascending infection by a punctilious toilet of the vulva after each stool or evacuation of urine.

After this time hot saline douches (110°F.) are given alongside of the tube. These douches should be four litres in amount, are to be given at low pressure, and should be administered twice daily. They wash the vagina free of any accumulation of fluid in its cavity, relieve the congestion of the pelvis, and prevent cellulitis. At the end of four days, douches of two litres are given through the tube and the remaining two litres are administered beside it. The douche through the tube cleans it, often opens up fenestrations that may be blocked, and favours a gentle current in that part of the pelvis completely shut off from the general abdominal cavity by the wall of the intestine, thus hastening complete evacuation. We do not think there is any danger of the fluid reaching the abdominal cavity, chiefly because of this walling-off, but also because of the low pressure at which the douche is given, and because of the precaution that is taken to keep the patient in the half-sitting posture at the time. These douches are to be continued every day until the discharge appears to have dried up.

The particular conditions in each case should be studied so as to decide on the proper time to remove the drain. We do not meet here the objection which is raised to vaginal drainage through an incision in Douglas' sac, and if it has happened sometimes that we have removed the tube too soon we have never had the annoyance of seeing the stump of the cervix blocked. Free drainage is maintained through the opening made and the tissues do not seem to have any tendency to come together and obstruct the opening. We have never been under the necessity of replacing a drainage tube that had been removed too soon.

We have said above that the abdominal wall is completely closed. Not infrequently we have placed a capillary drain, formed of a skein of horse hair, under the aponeurosis, in the case of a woman having a particularly fat abdomen. We have not always had union by first intention. Sometimes, at the end of six to eight days, it is necessary to release the incision at its lowest point in order to permit of the evacuation of a hæmatoma or a superficial or deep abscess. As a result the stay in hospital of these patients was prolonged by several days.

The vaginal route seems to us to be indicated, then, to permit of drainage from the pelvis and abdominal cavity. It is the low route to which gravitate all exudations or fresh secretions, and our only wish is to direct attention to the views of our masters on the question, for they seem quite logical.

We would emphasize chiefly the practical impossibility of the formation of adhesions at the level of the cavity where the peritoneum has been lost. Thanks to the shutting off of the cavity this is prevented.

It would seem that no serious objection can be raised to such a procedure. If, however, it is advanced that the drain is in close proximity to the urethra and the anus, and because of this can be a portal of entry for a fresh infection, we meet this by stating our conviction that a careful toilet of the vulva after micturition and defæcation, the use of douches given twice a day, and local dressings with vaccine, will eliminate all chance of contamination.

The isolation of the abscess cavity by the closing off of the pelvis renders it in some sort extra-peritoneal, and we find that the danger of contamination from outside is less than that occasioned by drains into the peritoneal cavity that pass through the abdominal parietes. This objection, the only one that in our opinion can be raised to our method, is removed by the fact that it applies to all forms of drainage, whatever they may be.

There is another point of view remaining to be studied—the economic and social point of view. One hundred patients who have had transcervical drainage remain in hospital eight hundred days less than those who have had abdominal drainage, apart from any consideration of the complications likely to be met with in all cases of laparotomy—phlebitis, abscess of the abdominal wall, pulmonary complications, etc. When our patients leave the hospital there is no necessity for them to be supervised by association nurses or social workers. They are cured. The patient drained by the abdominal route may return home with a fistula; her condition necessitates further care; she is on the road to recovery, but still requires dressing; she needs numerous wicks and compresses frequently renewed. The woman drained

by the transcervical route has no expense for dressings other than a few vulvar pads.

The form of drainage we recommend, transcervical or transcervico-vaginal, meets our present need, as it will do elsewhere at all times, that is the shortening of the time of hospitalization and the lessening of cost of medical care for the patient. It is effective, it prevents adhesions, and it abolishes the danger of eventration and infection.

Case Reports

AN OVARIAN PREGNANCY

By J. R. Goodall, B.A., M.D., D.Sc.,

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AND

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About one year ago a Mrs. A. was seen, who complained of severe cramp-like pains in the splenic region. She had wakened in the morning with this distress, and the suffering grew worse in the next two hours. She was examined as to her chest and abdomen without any definite results, and without any diagnosis being made. She had gone two weeks past her period, knew she was pregnant, yet had no symptoms referable to the pelvis. However, she was subjected to a bimanual examination, and there were all the signs of a normal intra-uterine pregnancy about the duration stated.

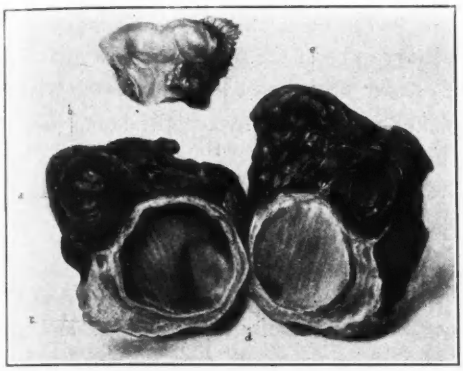
Symptomatic treatment was recommended, and the next day she was seen again. The cramps had disappeared, but had come on again in the region of the precordium. She was bleeding quite freely from the vagina. After another general examination, without results, a vaginal examination was done, and the cervix was found slightly dilated and products of conception hanging from the cervix.

She was transferred at once to the hospital, anæsthetized, and when the vagina was being washed a perfect cast of the uterus fell out. A careful bimanual examination, and a combined recto-vaginal bimanual were made, with the patient deeply anæsthetized, without discovering anything in the fornices. The uterus seemed slightly larger than the perod of amenorrhœa would indicate. The uterus was then explored and nothing was found. Not having had her consent to do an exploratory posterior colpotomy or laparotomy, the patient was put back to bed, and both she and her husband were warned that there certainly had been an ectopic fetus, but that it might have died, and that time would determine whether further surgical intervention would be necessary.

The patient was absolutely free from symptoms for five days. On the sixth, seventh and eighth days, at 5 o'clock, sharp pain of a cramp-like character in the left lower quadrant came on. The distress would last an hour or two and then pass off completely. Examination on the eighth day showed a uterus considerably larger than at the time of the first anæsthesia, and exquisitely tender.

Laparotomy was done at once and there was a very small amount of free blood found among the pelvic coils; the right ovary and tube were normal; the left tube was free throughout its whole length; and a mass, the size of a small orange, lay directly in front of the uterus in the vesico-uterine pouch. A very small amount of blood had agglutinated it to its abnormal site. The tumour was easily freed from its slightly organized bed, and proved to be the left ovary with a long pedicle. This was tied off at its pedicle and carefully laid away in hardening fluid. Upon second consideration, it was thought wise (just to remove any possibility of doubt) to remove the normal left tube also. Accordingly this was done. The meso-salpinx was long and absolutely free. It was suspected at once, of course, that we were dealing with an ovarian pregnancy, and everything was done with solicitude to keep the specimen as undisturbed as possible.

Pathological report.—The specimen consists of Fallopian tube, and a detached tumour the size of a small apple. The specimens have been hardened in formalin for 14 days. The tube, detached, presents nothing abnormal. Its fimbriæ



Ovarian pregnancy. (a) Amniotic sac containing fetus. (*b*) Placental tissue. (*c*) Ovarian tissue. (*d*) Cyst. (*e*) Blood clot.

are free and its peritoneal surface smooth. The tumour is irregular in outline, roughly subspherical, with two rounded slight elevations on its surface. One side is almost smooth; the other, flatter, shows old extravasated blood with beginning organization.

After careful study, it was decided to section it parallel with its long axis, so as to bisect the two elevations, which were thought to be parts of interest. The cut could not have been more fortunate. The incision cut through the intact amniotic sac, and in it to one side lay a perfectly preserved white fetus on a smooth amniotic surface. The gestation sac measured 2 cm. in diameter. The other elevation was a beautiful cyst of the ovary, measuring 3 cm. in diameter, with its opalescent, solidified contents perfectly preserved. These two cysts, the amniotic sac and the cyst were separated by a strand of tissue about 1 cm. in thickness.

Sections were taken from the wall of the sac, from the cyst wall, from the tube, and the specimen was sent immediately to the art department for a drawing by Miss Blackstock. The accompanying illustration gives a very good idea of the relation of structures.

Microscopically.—The wall of the sac shows numerous fetal villi, which are in such a perfect state of preservation that the structures must have been alive when the specimen was immersed in the preservative. There was no trace of unstriped muscle to be found. The cyst is a simple unilocular one with a simple cubical lining. The surrounding ovarian tissue is highly vascularized, but otherwise normal. The tube, on cross-section, shows no evidence of pathological changes.

REPORT OF A CASE OF HÆMATOSALPINX SIMULATING APPENDICITIS, IN A FLAT PELVIS, AT EIGHT AND ONE-HALF MONTHS OF PREGNANCY

By Wm. J. Stevens, M.D., C.M.,

Ottawa

The patient was aged 33 years. Her first pregnancy, almost three years previously, terminated with the craniotomy of a macerated fetus of eleven pounds, owing to a flat pelvis.

Her last period was on September 7, 1928, the expected date of confinement was June 14, 1929. Her antenatal period was normal prior to May 1st, about which date the initial signs of trouble in the right lower quadrant were noticed,—occasional bothersome dull pain and tenderness, which became accentuated as time went on and did not respond to ice in bed. On May 11th, it was deemed advisable to bring the patient to hospital on account of the continuance of the pain.

On May 12th, her cell count was red blood cells 4,000,000 per c.mm.; white blood cells 10,000; hæmoglobin 70 per cent; urine, amber, acid, specific gravity, 1015, a faint trace of albumin. The temperature was 99°; pulse, 100; respirations 20. The patient was nauseated and vomited some yellowish material. The abdomen presented an extraordinary shape. The rather small uterus was markedly deviated to the left, while the right lower quadrant was very tender, painful, and rigid. A mass about the size of a large walnut was palpable in the right lower quadrant. A rectal examination disclosed that the head was entering the pelvis. The fetal heart was in the left lower quadrant.

On May 13th white blood cells were 11,200; the abdomen showed some distension; vomiting persisted. On account of the acuteness of the condition, on the night of May 13th, as had been anticipated, a Cæsarean section was done. Examination of the abdominal cavity revealed a right-sided, lemon-sized, dark coloured hæmatosalpinx with a twisted tube pedicle. After untwisting the pedicle, the mass was clamped and removed. The appendix was about three inches long and appeared to be markedly reddened. It was removed, with purse-string invagination. An intravenous glucose injection was given immediately after operation. The patient made an uneventful recovery. The baby weighed 6 lbs. 4 oz., was atelectatic at birth, and after a stormy siege, with oxygen, etc., made a nice recovery.

The pathological findings were: The right tube was the size and shape of a large hen's egg. It was dark red in colour, the fimbriæ being well defined. There was evidence of twisting of the pedicle. On section, the lumen was loaded with blood.

Microscopic examination of tissue from the wall showed no evidence of decidua cells. The condition found was, therefore, hæmatosalpinx with twisting of pedicle.

The appendix was about three inches long by one-half in diameter. The surface showed evidence of old adhesions and on longitudinal section the lumen was found to be empty.

COMMENT

The aphorism, "In such cases of doubt, operate," might be applied here. In the differential diagnosis there must be considered; acute appendicitis, twisted ovarian cyst, acute salpingo-öophoritis, extra-uterine pregnancy, pyelitis, an infected or twisted fibroid, cholecystitis, cholelithiasis.

Here the hæmatosalpinx was the result of rupture of blood vessels in the lumen of the tube, owing to torsion and pressure, probably resulting from the pregnancy.

Just what might have happened had the mass ruptured during the uterine contractions of labour, or otherwise, is a matter for speculation, and makes the case an interesting one.

A SOLITARY CYST OF THE KIDNEY

BY C. W. BURNS, M.D.,

Lecturer in Surgery, Manitoba University, Winnipeg

Solitary cysts of the kidney are comparatively rare. They are more common in women than men and more often involve the lower pole of the kidney.

I report this case for two reasons: (1) because of its rarity; and (2) because the kidney was saved.

The cyst occupied an intimate position in the kidney, insinuating itself into the parenchyma in much the same manner as the head of the femur fits into the acetabulum of the pelvis.

The patient was an Italian woman, aged 51 years, overweight, and her general appearance was not suggestive of any serious malady. She was admitted to St. Boniface Hospital on July 9, 1929.

Complaints. — A dragging or bearing-down sensation in the lower abdomen, with discomfort and a sense of fullness; anorexia; frequency of micturition; and a leucorrhœal discharge. There was no actual pain. The symptoms had been more aggravated during the previous six weeks.

History of illness.—About three weeks prior to admission she had consulted her physician because of pain in the abdomen and flatulence. He advised her of the presence of an abdominal tumour. From this time on she had felt out of sorts. Probably the anxiety accounted for the moderate aggravation of symptoms. There was frequency of micturition increased by fatigue, associated with a burning sensation, less troublesome at night than in the day.

Personal history.—No severe illnesses at any time; four children; normal confinements; menopause five years ago.

Physical examination demonstrated nothing abnormal above the diaphragm.

The abdominal wall was fatty but the muscles lax. The spleen was palpable, the area of dullness normal. There was no tenderness in the upper abdomen. In the left abdomen, just below and lateral to the umbilicus, a tumour mass could easily be felt. It was about the size of

a grape fruit, regular in outline, not tender, fairly mobile. It could be moved medially and inferiorly as low as the brim of the pelvis, without great discomfort to the patient. The mass felt cystic.

Pelvic examination was negative. We felt we could exclude an ovarian cyst. The urethra was negative .

A rectal examination was negative.

As a result of the clinical examination we considered the three following possibilities: omental cyst, mesenteric cyst, or left kidney tumour.

Urinalysis. — Straw colour; reaction acid; specific gravity 1010 to 1012; sugar, none; albumin, none (on one examination a trace of albumin was reported); microscopically, a few pus cells were seen but no red blood cells.

Blood count.—Red blood cell count, 4,840,000 per c.mm.; hæmoglobin 90 per cent; white cell count, 5,800; differential count normal.

Roentgenological examination.—"Film of the abdomen before barium enema shows a faintly discerned large ovoid mass, the size of a grape fruit in the left hypogastric area. It does not appear to arise from the kidney or from the bowel, but rather from the pelvis."

Barium enema.—"No filling defect. There is a distinct pushing away of the splenic flexure to the extreme outer and upper portion of the left hypochondrium. Unfortunately, the splenic flexure is displaced off the film and no definite local pressure defect can be made out."

In requisitioning, we had particularly asked for a search for pressure defect or deviation of the descending colon. In tumours of the left upper abdomen very useful information may often be acquired from this observation. From post-operative re-check of the films we feel we should have diagnosed kidney tumour.

Pre-operative diagnosis.—Omental or mesenteric cyst, or kidney tumour.

Operation.—A mid-left rectus incision was made. Exploration readily determined that the tumour arose from the kidney. With the usual technique the kidney was exposed by the transperitoneal route. The tumour occupied, or rather replaced, the lower pole of the kidney. Its convexity fitted deeply into the corresponding concavity of the kidney substance so that it occupied a position well up to the level of the pelvis The tumour was obviously cystic and contained a clear fluid. Its diameter was considerably greater than that of the upper pole. The cyst wall was thin with the greater thickness of the capsule just at the kidney margins.

On account of this position, relatively close to the great vessels, one at first considered that enucleation would be impossible on account of uncontrollable hæmorrhage. The kidney was, however, easily mobilized, and after incising the outer layer of capsular attachment with sharp dissection, the cyst was quite easily separated by blunt dissection. Hæmorrhage, at first quite free was controlled by mattress sutures. The margins of the kidney with its capsule were then sutured, to partially obliterate the concavity left by the enucleated cyst which was quite the size of an ordinary grape-fruit and was removed intact. Extra peritoneal drainage was inserted through a stab wound in the flank.

Convalescence was uneventful.

DIATHERMY IN THE TREATMENT OF DACRYOCYSTITIS

By John Hunter, M.B.,

Toronto

Having read the three papers on dacryocystitis and its treatment in the December number of this *Journal,* I felt that a report of the following case would be interesting.

The patient was a physician, aged 80 years, healthy, and with no previous eye trouble. Lacrimation with epiphora became troublesome last May, and as he was reading and writing a good deal he blamed his glasses for the trouble. He consulted an ophthalmologist who said that it was not the fault of the glasses but of an obstruction, probably a mucous plug, in the tear duct. A probe was passed down the canal, and he was told to return again if not relieved. The patient, on leaving the office, stepped into a street car, the door and windows of which were open. Before starting, a load of broken stone was dumped near the car, filling it with dust, which irritated the eye very much. The eye was bathed with hot boracic solution until the irritation was completely relieved. The patient was unable to revisit the ophthalmologist and the lacrimation and the epiphora were very annoy-

ing. The skin on the face under the eye was swollen and discoloured from constant mopping. He was using diathermy on his own patients at the time, and they kept bantering him about not using it on himself. One evening he placed an electrode (½/3) over the inner angle of the eye and another (3/3) on the back of the neck. Heat to tolerance was applied for fifteen minutes. The relief of symptoms, in an hour or two, was very marked. Treatment was given twice daily for two or three days, with complete relief of all symptoms. He consulted the ophthalmologist to see if anything further was required, and was assured that the cure was complete.

The physical properties of diathermy make it a very valuable adjunct in many acute affections of the eye, and its appendages. The heat produced within the tissues causes dilatation of the ducts, of the capillaries, venules, and lymphatics. The circulation is quickened, more oxygen reaches the tissues, the toxic products are more quickly removed, metabolism is enhanced, and physiological function is re-established.

Retrospect

RECENT ADVANCES IN OPHTHALMOLOGY IN REGARD TO DIAGNOSIS AND PATHOLOGY*

BY S. HANFORD MCKEE, B.A., M.D.,

Montreal

Art is long, time is short, and judgment difficult, even as it was when Hippocrates so expressed himself.

It would be impossible indeed in an address of this length to review fully the recent advances in ophthalmology in diagnosis and pathology. The subject has therefore been approached in a general way, with an attempt to direct you, as practical clinicians, to certain phases of that progress which seemed to me important.

Within recent years these advances have been dominated by a number of factors, among which the improvement in the accuracy of diagnostic methods, and the application of physics and chemistry to ophthalmological problems, stand out pre-eminently. Accuracy in diagnosis has been much assisted by the introduction of the electric ophthalmoscope, the tonometer, the improved perimeter, the slit-lamp, fundus photography, better radiography, gonioscopy and improved bacteriological and pathological technique. The improvement in equipment, as, for example, the binocular ophthalmoscope of Gullstrand and the slit-lamp, has been striking, and this, with the very definite trend of ophthalmology, as well as medicine in general, towards the assistance of physics and chemistry, has enabled ophthalmology to progress as definitely as any other branch of medicine. It is only those of you who have examined bedridden cases in light hospital wards who realize fully what a boon the electric ophthalmoscope has been. Formerly, assistance was generally necessary, and, under the most favourable of circumstances, fundus examinations were often unsatisfactory. Now, with the electric ophthalmoscope we may examine large numbers of such cases with ease and comfort, which undoubtedly makes for accuracy.

The taking of tension formerly was guess-work at best. The tomometer is not an accurate instrument as regards the absolute measure of the intraocular pressure. Nevertheless, as a clinical instrument its value is undoubted. The margin of error within which the records of a good instrument lie is much smaller than the margin of error associated with most clinical methods, and its use undoubtedly marks a distinct advance over previous methods. Likewise, using a perimeter, with illumination of equal intensity on every point of the arc, with adjustments for the accurate location of the eye at the centre of the perimeter system, with fixation devices for eyes suffering from myopia, hyperopia, presbyopia and with central scotoma, with preexposure cards of neutral shades of grey and stimulus cards with backgrounds of the same shades, and with accessories for studying the blind spot, and a tangent screen for campimeter determinations of scotoma, must mean the elimination of much unreliable data, and supply us with records which can be relied upon when making our deductions.

Without doubt the slit-lamp has proved itself the most valuable and fruitful of recent advances in aiding ophthalmological diagnosis. It is composed of four essential elements: (1) the luminous body; (2) the condenser; (3) the slit; (4) the illuminating lens; and in principle is merely the scientific adaptation of oblique focal illumination. In its application six methods of technique are available, and the efficiency of the instrument in the finer points of diagnosis depends largely on the proper choice and application of those methods of varying and controlling the illumination. The six methods are as follows: (1) direct illumination; (2) diffuse illumination;

*Read as part of the Instructional Course of the American Academy of Ophthalmology and Oto-Laryngology, Atlantic City, October 25, 1929.

(3) retro-illumination; (4) the examination of zones of specular reflection; (5) indirect lateral illumination; (6) oscillatory illumination.

"Its chief value consists in the opportunity it has provided of observing directly in minute detail, and correlating into one composite picture processes whose intimate nature had to be inferred before its introduction from the older and cruder methods available to the clinician or referred to the pathologist. In comparison with the histological method of enquiry, the higher magnifications, such as required to reveal cytological structure, are impracticable. This limitation is partly due to mechanical difficulty. The resolution of the finer details of the observed tissue is essentially a function of the numerical aperture of the objective employed in the microscope, and since each increase in the objective magnification implies a decrease of the focal distance, and an accompanying diminution in the available light, extension in this direction as applied to the living subject is obviously limited. More important, the physiological impossibility of keeping the eye at rest during the examination limits the practical magnification to well below 50 diameters. In addition to the limitation of magnification, the contrast effects of differential staining which histology provides are not obtainable. Nevertheless, the opportunity is provided of studying changes as they actually occur unmodified by the artifacts inseparable from histological technique. In comparison with the older methods of clinical examination the slit-lamp has presented to us pictures with an elaboration of detail hitherto unrealized. It has allowed us to establish a minute and elaborate record of progress, and to determine with certainty and due appreciation those finer points of diagnostic and prognostic importance which formerly could only be made out with difficulty, or when they had progressed to a stage at which, measured by *its* standard, they appear as gross. In addition, structures which, owing to their delicacy, were not appreciated clinically have been revealed owing to the differences in their optical properties. (Duke-Elder p. 85)"

It is not the purpose of this communication to go into the details of slit-lamp technique. This now forms part of the routine examination in most well-equipped offices, so that many of you know its wonderful assistance, especially in the early stages of inflammation. Vogt says that if the slit-lamp had no other value than in providing the opportunity for recognizing sympathetic ophthalmitis at an early date, it would justify its cost and the labour expended in mastering its technique.

The recent demonstration of the practicability of obtaining x-ray photographs of the apex of the orbit has added to our opportunities for refinement in diagnosis. The most important application of the method is in the investigation of tumours of the optic nerve and the retro-ocular extension of retinoblastoma. The spread of an orbital tumour up the nerve into the cranial cavity, or of a chiasmal tumour through the canal into the orbit, usually involves a thickening of the nerve which may result in an enlargement of the foramen detectable radiologically. The walls of the canal remain intact so long as the neoplasm is surrounded by the nerve sheath, but as soon as the tumour breaks these bounds erosion of the bone is liable to occur. Meningioma and retinoblastoma met with in this region are relatively non-malignant, but recent studies have suggested that extension upward to the chiasma and even to the optic nerve is, perhaps, more frequent than has been supposed. In the first work on radiography of the lacrimal passages, bismuth paste was used as a means of delimiting the structure. The technique has been considerably improved, and now by the use of lipiodol as an opaque material, instead of a paste, many advantages, such as greater accuracy, easier injection, less disturbance, and easier removal, are to be noted. By the observation of the state of the passages and exact delimitation of the site and extent of any obstruction, valuable information may be obtained as to the best method of treatment to be employed, and adequate control is provided to gauge the efficiency of any drainage operation or the progress of the course of repeated probing.

Recent investigations of the biochemist and embryologist, with the aid of the slit-lamp, have revolutionized most of the traditional conceptions of the opaque lens. The slit-lamp has made possible the study of cataracts in their earliest stages. New types have been discovered, and the tissue changes minutely described. The formation of an organic change in the lens is essentially a coagulation of the lens proteins and it is believed to be associated with the same factors which cause coagulation of protein in the test tube.

Glaucoma

It is stated now that in glaucoma, a congeries of diseased conditions, the raised tension is not an essential factor but only one of the more obvious manifestations of a general derangement in the intimate economy of the eye; that glaucoma is by no means identical with hypertension of the eye ball. Glaucoma is the disease, and hypertension only one of its symptoms. The central point is the mechanism of the maintenance and variation of the physiological intra-ocular pressure. We take it that the intra-ocular fluids are in equilibrium with the capillary blood, that the height of the intra-ocular pressure is maintained at the level of the hydrostatic pressure in the capillaries, less the difference between the osmotic pressures of the plasma and the aqueous humour, and that it is varied by those factors which alter either of these two quantities that increase the volume pressure of the contents of the globes. Further, we take it that these changes are compensated, within limits, by an escape of aqueous humour through the safety valve action of the canal of Schlemm and the other venous exits; but, in so far as their mechanism is rendered insufficient or ineffective by pathological changes, so will these alterations in pressure tend to become cumulative and permanent. It is definitely established that a high blood pressure is not an essential, nor even an important, factor in the etiology of glaucoma, though it is certainly true that glaucoma is very frequently associated with disease of the arterial system, usually of a widespread nature—that a glaucomatous eye is "a sick eye in a sick body."

The tendency for acute glaucoma to occur in persons of an emotional temperament has long been recognized, while of recent years a large amount of attention has been devoted to the etiological importance of the part played by the endocrine group of glands, and to the association with the sympathetic nervous system. Glaucoma is regarded as an expression of some such irritating influence from the central nervous system, as a vaso-neurosis, or as due to a loss of equilibrium between the glands of internal secretion. Whatever be the immediate cause, there is no evidence of any mechanism other than a vasomotor one being called into play. There may be many exciting factors, but in primary glaucoma other considerations—the shallowness of the anterior chamber, the evolution of peripheral synechiæ, point to the fact that obstruction to the exit of fluid is a secondary and adjuvant factor in the etiology of the disease rather than the primary—a consequence rather than a cause. Further, in some cases of glaucoma, as demonstrated by the gonioscope, the angle of the anterior chamber may be perfectly and entirely free. The etiology of pathological rises in the intra-ocular pressure and of glaucoma includes not one condition but many. According to Duke-Elder, they may be divided into three classes, involving three equilibria:

(1) between blood plasma and the intra-ocular fluids, (decrease in the salt content and increase in the alkalinity of the blood, vaso-dilatation and increase of the permeability of capillaries);

(2) between the intra-ocular fluids and vitreous body, (derangement in the intimal economy and the state of the turgescence of the vitreous body, probably primarily due to a circulatory derangement);

(3) between the blood plasma in chorio-capillaris and the sensory epithelium of the retina, (probably here again the primary cause in many cases is to be found in the capillaries).

So far as the tension of the eye is concerned, the potential effectivity of either of the first two factors is increased by inadequate facilities for drainage at the canal of Schlemm; in most cases this, in association with an acute vascular crises, is the immediate cause of acute exacerbations of the disease.

Then again, glaucoma is stated to be in the nature of an œdema, with added factors, hormonal, nervous, toxic or infectious, and early influences of cellular autolysis; glaucoma is œdema, which is an increase in the amount of intercellular fluid; it is therefore the local manifestation of a systemic disease. Œdema is now considered to be the result of a change in the permeability of the capillaries. The etiology of glaucoma is certainly not singular, but multiple. The chief cause lies in a derangement of the permeability of the capillary wall, after the latter has been altered by: (1) angiosclerosis; and (2) instability of the nervous system. On the other hand we must not shut our eyes to the fact that the glaucoma process cannot be entirely analyzed by means of the modern physio-chemical theories. It was because our coarse anatomical ideas had disappointed us, that we looked for more generally somatic causes, and glaucoma was placed on the list of modern constitutional problems. The influences to which intra-ocular pressure is subject from the side of the general circulation or the vegetative nervous system or the osmotic equivalence processes, and the correlations of internal secretion, are so manifold, that any theory which attempts to bring one of these factors forward as the decisive one bears the stamp of imperfection. In seeking the pathogenesis of glaucoma we must return again and again to the tissues of the body.

Halos, so intimately associated with symptoms of glaucoma, may be physiological as well as pathological. Physiologically, the phenomenon may be caused by:

(1) the posterior endothelial cells of the cornea, whose action can be easily illicited experimentally, and may occasionally be evident clinically;

(2) the epithelium of the cornea;

(3) the fibrillary structure of the lens making it function as a radially arranged diffraction grating. This is the origin of the most common and most early seen physiological halo.

Pathologically, the appearance is caused by:

(1) mucus, lacrimal secretion, and blood in the conjunctival sac, especially when mixed with air bubbles;

(2) an œdematous state of the cornea.

Of these the latter is the more important, and occurs typically in states of raised tension. The halos of glaucoma are readily diagnosed from those due to conjunctival secretion, by the disappearance of the latter on winking.

HERPES

A large amount of work has been expended upon the various manifestations of herpes and those diseases with which it is associated. Some years ago the existence of a specific herpes virus was established. It is an ultra-microscopic filter-passing organism. When it is transferred to the cornea of the rabbit it produces a lesion, and the infection travels up the nerves and produces an affection of the central nervous system—herpetic encephalitis. The virus will travel up to the central nervous system by any nerves which supply the affected area, motor, sensory, or sympathetic. In the case of herpes corneæ, the route is by the first division of the fifth, and the primary central lesion is in the bulbo-spinal root.

Related to herpes simplex is herpes zoster, and symptomatic herpes zoster. The first is an acute epidemic disease caused by a filterable virus, whose focus of infection is probably the Gasserian ganglion. The clinical manifestations are different, and the histological lesions are not the same. A certain amount of clinical evidence associates herpes zoster with varicella. There is also a close immunological connection between epidemic herpes zoster and vaccinia, and all

three may produce a form of encephalitis allied to encephalitis lethargica.

Herpes simplex, as it affects the cornea, is a local lesion, the most common clinical manifestation of which is a dendritic ulcer.

Herpes zoster epidemicus is an acute infection, epidemic in nature, affecting the posterior root ganglia, the nerve fibres originating from these ganglia, and the skin, mucous membrane, and other structures supplied by these nerves. The initial corneal lesion seems usually to be a subepithelial infiltration in the superficial layers of the substantia propria. Accompanying these corneal lesions there may be a marked diminution of sensibility, a local rise of temperature, an iritis or iridocyclitis, a complicated cataract, an increase or decrease in the intraocular tension, or an optic neuritis, which may be followed by an atrophy, and a third or seventh nerve paresis.

SYMPATHETIC OPHTHALMIA

There are two surviving theories of sympathetic ophthalmia:—anaphylactic and infective. The anaphylactic theory, supported by experimental evidence, is that injury to the exciting eye resulted in the liberation and general distribution of pigment from the uveal tract, the absorption of which produced a hypersensitivity of the organism as a whole and especially of the homologous organ, the fellow eye. Subsequent absorption resulted in the anaphylactic intoxication, which in the sensitized uveal tissue of the other eye was manifested clinically as sympathetic ophthalmitis. An infective origin is strongly suggested by pathological findings, though the two questions, the nature of the hypothetical organism and the route of its entrance, still remain unanswered. It is claimed that, if sectioning of the optic nerve be carried far enough, pathognomonic lesions of a diffuse or nodular granulomatous infiltration of lymphoid and epithelial cells will be found. This is identical with the lesion which occurs characteristically in the uveal tract, and strongly suggests an infection by direct extension along this route.

MELANOMA

The subject of melanosis has, in the last few years, occupied increasing space in the medical literature. The black pigment, melanin, is now generally regarded as a product of cell metabolism, and the term "melanoma" should be limited to those tumours containing true melanoblasts, that is having the power of forming melanin. Certain pigmented tumours exist in the choroid, which are undoubtedly benign growths. The ophthalmic picture is described as follows:

> In size they vary from about one-half the area of the optic disc to about four times its area. They are roughly circular or oval in outline, the edges everywhere quite definite, without being quite hard and sharp; there is no shading off into the surrounding fundus nor is there any light fringe or evidence of pigmentary disturbance at the edge. They are of quite homogeneous appearance, and the choroidal pattern, although plainly seen around, is not seen over the area of the growths. In colour they are exactly that of blue ointment, differing only in their density. All are single and close to the optic papilla. They are all discovered by chance—none of them giving rise to symptoms. During the time the patients are under observation there is no change in the appearances. There is no abnormal pigmentation of the eyes discoverable on external examination. (Doherty)

While there seems to be very strong evidence that these growths do not become malignant, and are congenital, we do know that there are many instances on record of malignancy of unusual chronicity, so that a knowledge of these conditions and their possibilities is of extreme importance.

ANGIOMATOSIS RETINÆ

The typical picture of angiomatosis retinæ of v.Hippel consists of a pair of hugely enlarged vessels, often emerging from the lower part of the disc, to disappear in a small tumour mass in the peripheral retina. The vessels, though of approximately the same colour, can be distinguished by the fact that the vein is the larger of the two, whereas the artery is often beaded and of varying calibre. Not infrequently, in course of time, other small tumours may appear in other parts of the retina, with the development of a similar pair of vessels.

The process slowly advances, with the ultimate occurrence of secondary changes in the shape of opacities and infiltrations due to exudative secretion and sometimes to hæmorrhages, with the formation of a reactive gliosis, iridocyclitis, detachment of the retina, and glaucoma which may necessitate enucleation. These secondary changes, which fall into the category of Coat's proliferative retinitis, ultimately serve to conceal the nature of the primary lesion. Both eyes are likely in time to become involved, and the condition has been found in many cases to be familial. Though the histological nature of the underlying lesion remained for a long time obscure, it is now known to be a hæmangioblastoma, a form of tumour which exudes plasma and tends to produce cysts having xanthochromic fluid contents. It, moreover, has come to be appreciated that coincidental hæmangioblastic cysts are not infrequently found in the cerebellum, arising usually from an *anlage* over the posterior part of the fourth ventricle. Lindau's studies have served to show that these angioblastic lesions of the nervous system are not infrequently found in association with cysts of the kidney, cystic pancreas, hypernephromas, and tumours of the adrenal glands.

TRACHOMA

Perusal of the literature of the recently held "13th International Ophthalmological Congress" brings again vividly to our minds what a universal world scourge trachoma is. In 1907 chlamydozoa, or trachoma bodies, were first described, and for some years following great activity was shown in investigating these forms. Although epithelial cell inclusions are to be found in quite a number of other conditions, they are still closely associated in the minds of many

with the etiology of trachoma. Regarded as nuclear degeneration, the product of mucous secretion under pathological conditions, bacteria, nests of hæmoglobinophilic bacilli, the opinion has recently been expressed that the inclusion bodies in the epithelial cells originate from rod-shaped micro-organisms which tend to occur as diplobacilli. That the development of the inclusion body after the entrance of the rod into the cytoplasm of the cell is due to the multiplication of the organism and subsequent reaction on the part of the cells against the invading bacteria. The reaction transforms them into the small reddish staining coccoid forms designated as elementary bodies. The blue staining mantle represents the partially dissolved portion of the bacteria. From the study of trachoma and the trachoma bodies developed the study of the conjunctival epithelial cells, with the result that it is well established that pathogenic conjunctival bacteria, such as gonococcus, pneumococcus, Koch-Weeks' bacillus, diphtheria and influenza bacilli are parasites of the epithelial cells. It has been established that the diplo-bacillus is so also. They proliferate on the surface of the cell and draw nutriment from it. As they penetrate the deeper layers, one finds cell proliferation and reaction. The older epithelial cells are cast off and the younger ones phagocytose the bacteria.

Noguchi, in 1927, while working on the etiology of trachoma isolated a small gram-negative bacillus from cases of this disease among the American Indians. The micro-organism was similar in morphology to the bacillus xerosis, but d ffered from it in being gram-negative and negative to growth on plain agar and broth at any temperature. A more striking difference was that the Noguchi bacillus was motile. It moves by a single flagellum which arises usually from one of the poles, but occasionally appears as if attached to one side. These properties definitely removed this bacillus from the diptheroid group, so frequently found in the normal and inflamed conjunctiva. When injected into the conjunctiva of the macacus rhesus monkey, this micro-organism set up a granular conjunctivitis with scarring, which resembled, grossly and microscopically, trachoma in man.

Gonorrheal Ophthalmia

While the clinical signs of a gonorrheal ophthalmia are well established at the end of the third or fourth day, examination of the discharge may show a few gonococci, but more likely no micro-organisms will be found. If a smear is prepared so that the epithelial cells may be examined, gonococci in large numbers will be found within the cytoplasm of the cells; that is, the new or young epithelial cells phagocytose the bacteria. This process of phagocytosis probably lasts until all the micro-organisms have been disposed of, and in gonorrhœal infection this may take weeks. The study of the trachoma bodies developed the epithelial cell smear, a very definite step forward in conjunctival bacteriological technique.

Retinitis

The extreme view has been put forward that arteriosclerotic and renal retinitis are indistinguishable, the appearance of the hæmorrhages and the white patches, and the changes at the disc in the former, differing from those in the latter only in being the result of a slower and less concentrated action of the poisons in the blood. It is held that a distinctive form of retinitis develops in some cases of arteriosclerosis, due primarily to the local impairment of the capillary endothelium from its deficient blood supply, and that this type can be distinguished ophthalmoscopically and carries with it a better prognosis than renal retinitis. Doubt is expressed as to whether a retinitis due to diabetes alone ever occurs. Certainly, in cases where retinal disturbances complicate this disease, albuminuria, as well as high blood pressure, usually complicates the clinical picture, and in young subjects in whom the toxic elements are manifested in their most malignant form, retinitis does not occur.

On the other hand it is contended that there are features, such as the appearance and location of waxy looking exudates, circular hæmorrhages, the absence of a star figure, of cotton wool patches, and of pigment spots in the later stages, which form a picture which is characteristic to such a degree as to enable one in some cases to say with assurance that the condition is due to diabetes.

Photography of the Fundus

Interest in fundus photography is steadily increasing. A photograph shows the definite condition present at the time of examination. More detail is secured and made part of a permanent record by this method than by any which has ever been devised. For determination of progression or retrogression of retinal lesions photographs are incomparable. Vascular changes may be diagnosed and an accurate prognosis can be given if a serial photographic study is made.

Since Waren Tay, in 1894, described certain white dots in the fundus at the yellow spot region many reports of somewhat similar conditions have appeared. The descriptions are confusing and the titles misleading. By using the Gullstrand ophthalmoscope the depth of individual lesions may be appreciated. With stereophotographs we are able to show diseases and study the particular level of involvements. The deposits so well described by Tay remain clinical entities. The shining dots of Gunn have not been verified in front of the retinal vessels. The association of hyaline deposits with other diseases has not been sufficiently emphasized. Only by stereo-examination or by stereophotography is it possible in the moot cases to decide the location of the lesion definitely.

INTRACRANIAL TUMOURS

It lies within the memory of most of us when the recognition of an intracranial tumour rested on the triad of headache, vomiting, and choked disc. Tumours were supposed to be rare, and when, on the basis of these so-called cardinal symptoms, one was suspected, surgical intervention was likely to be postponed until vision was seriously impaired The past quarter of a century has seen a greater revolution in all this than is generally appreciated The methods of localization have been vastly improved, the technique of the surgical procedure has been completely transformed, and the microscopic differentiation of the many varieties of tumour, all of which vary in their life history in their behaviour, and, consequently, in their prognosis, will soon be put on a sound basis.

It is not only essential that the presence of a tumour and its precise location be reasonably assured before it is attacked, but it should be possible to make at least a presumptive guess as to its histological nature and the likelihood of recurrence, for these things will greatly influence the surgical procedure. The goal in short is to recognize the peculiar manifestations of a particular kind of tumour in a particular region at the earliest possible stage of the process, in order that an operation may be undertaken under the most favourable auspices.

Meningiomas (which name has been substituted for the unfortunate misnomer "dural endothelioma"), represent about twelve per cent of all intracranial tumours and differ considerably in their gross appearance as well as in their microscopic structure and rapidity of growth. Nevertheless, they are all akin. They have favoured seats of origin in each of which they show differences of behaviour that provoke a recognizable train of symptoms which is strikingly similar from case to case. For example, the combination of unilateral exophthalmos with marked hyperostosis of the lateral wall of the orbit and temporal fossa is almost invariably associated with a peculiar flat tumour (*méningiome en plaque*) that spreads over the meninges covering the anterior and lower part of the temporal lobe without producing any intracranial symptoms whatsoever. Certain other meningiomas, which we should be quick to recognize, take their origin from the basilar leptomeninges in the vicinity of the pituitary fossa. Some arise from the olfactory groove, while others, with equally unmistakable manifestations, arise from the sphenoidal ridge, lateral to the sella turcica, and implicate the adjacent optic and oculo-motor nerves; still others may actually arise from the meningeal expansions constituting the sheath of the optic nerve within the cavity of the orbit.

The "dural endothelioma" is now known to most neuropathologists as the "meningiofibroblastoma." The name dural endothelioma was originally used for the reason that this tumour was thought to arise from endothelial cells. Even now the exact origin of the tumour is not perfectly clear. By some, it is thought to be more closely related to the fibroblast than to the endothelial cell. Yet the writers think that they arise from the cells which line the arachnoid spaces. Until the exact relation of these tumour cells to normal cell types is proved, an exact nomenclature for the tumour is not possible. The characteristic microscopic finding in the so-called dural endothelioma is a whorl-like arrangement of the tumour cells. In the eye these tumours arise from the normal reflection of the meninges on to the optic nerve and they correspond in all their details to the tumours arising from the meninges of the brain itself.

As supra-sellar meningiomas from the tuberculum sellæ in the course of their growth separate the optic nerves and become straddled by the elevated and flattened chiasm they are of special interest to ophthalmologists. They sound an early alarm because of their position, and they may consequently be recognized and operated upon more promptly than would a meningioma of comparable size in any other situation, unless possibly one in the spinal canal.

The meningiomas that arise from the basilar leptomeninges in the vicinity of the pituitary fossa do not as a rule cause the reactive hyperostosis which so often makes it possible to determine the exact point of origin of meningiomas elsewhere in the cranial chamber. They are, consequently, more difficult to recognize and localize precisely, and if they are to be picked up at a stage when they are easily removable this can be accomplished only by full knowledge of the symptom-complex they produce.

Owing to the fact that these tumours are prone to cause primary optic atrophy, they are of special importance to ophthalmologists. Some of them arise from the sphenoidal ridge lateral to the sella, press against the adjacent optic nerve, and finally implicate the chiasm, causing a homonymous hemianopsia. Others arise from the olfactory groove, and provoke a characteristic chronology of symptoms beginning with unilateral anosmia, followed by an isolateral optic atrophy, and ultimately by a choked disc in the contralateral eye. This combination of signs and symptoms, known as the "Foster Kennedy syndrome," is unmistakable, though the olfactory groove tumours may reach an enormous size before their presence is suspected.

In the group of meningiomas which arise from the arachnoid over the tuberculum sellæ, the ophthalmological symptoms are produced while the lesion is still small and easily removable. In the progress of their growth these mesially placed tumours separate the optic nerves, elevate the chiasm, and ultimately lead to blindness, to absorption of the sella, to hypopituitary, hypothalamic, uncinate and general compression symptoms; but in the stage in which they are favourable for operation they are associated with a characteristic syndrome whose essential elements are as follows:—

(1) They occur in patients of middle age;
(2) impairment of vision is the earliest, usually the only, symptom complained of. The fields become bitemporally constricted, though as a rule the process does not advance with equal steps in the two eyes;
(3) a primary optic atrophy is invariable, disclosed by the ophthalmoscope.
(4) At the stage when they are favourable for operation, the tumours do not deform the sella turcica nor cause secondary symptoms of hypopituitarism. This fact renders them distinguishable from the general run of hypophyseal adenomas, which also cause bitemporal hemianopsia and primary atrophy, but which usually arises within and distend the sella.

In conclusion, I can only refer you to the immense research opened up by the study of the ultra-microscopic viruses, and the work on the herpes virus, especially as related to sympathetic ophthalmia. Our knowledge of the intimate anatomy of the visual tracts, from the retina to the primary visual centres, has been considerably increased. The work on retinal capillaries, closure of the central artery, ultra-microscopic studies of the vitreous humour, study of the aqueous humour, the nature of the intra-ocular fluids, experimental production of lesions resembling phlyctenules, the production of fatty infiltration of the cornea resembling arcus senilis, the elucidation of the condition of the anterior chamber in glaucoma, moving pictures in investigative and teaching work, the different kinds of eye pigments, as shown by tissue cultures, experimental tuberculosis of the retina, fungi and higher bacteria in their relation to diseases of the eye and adnexa, the ocular mycoses, are all worthy of your careful study.

In the matter of diagnosis, Kennedy's scotoma in frontal floor tumours should be emphasized. Cushing's syndrome in temporal lobe tumours, quadrant anopsia, scotoma in choked disc, new ideas on central scotoma, typical finger scotoma, differing from the central scotoma of other conditions, enlarged blind spot and moderate contractions of the field of vision, the newer conceptions of toxic amblyopia, headache, and eye disorders of nasal origin, the diverse opinions on squint amblyopia, retinal degeneration in the macular region, are only a few of the subjects which might be enlarged upon did time permit. These, I am sure, would lead us further to topics of equal interest and importance. While much has been done, there is, alas, still much to do. "Achievement is but another milestone along the highway of progress—the end of the journey lies ever beyond."

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3. DOHERTY W. B. *Trans, Am. Ophth. Soc.* **26:** 310.

(Very free use of these has been made.)

RECENT WORK ON CANCER.—Charles F. Geschickter reviews the work now in progress in European cancer laboratories, on the basis of a recent tour of investigation in Europe of four months' duration which furnishes one of the most reliable means of estimating the present status of cancer research. Work in America and in Europe in the field of malignant disease has become quite diversified but falls readily into the three fields of experimentation as to the cause, the diagnosis and the cure of cancer. There are four lines of investigation in the field of the cause of cancer—irritating agents, tumour filtrates, metabolic studies of the cancer cell, general systemic factors—which all embrace separate theories as to the origin of malignant growths. The metabolic studies of cancer, while most enlightening and encouraging, are at present beset with difficulties and shortcomings. All the metabolic experiments have had the shortcoming of comparing a malignant tumour arising in one type of tissue with normal tissue of a different and unrelated organ. No new form of cancer diagnosis applicable to all forms of malignant disease has been developed in recent years. The chief hope in this direction at present is a reliable differential stain for cancer. The search for a cancer cure is becoming more and more widespread. Radium treatment has had a distinct rise in popularity both in Europe and in America, but in Regaud's clinic in Paris, where the results have been most carefully checked, this mode of treatment has been found useful only in cancer of epidermal origin and has a close competitor in surgery. Treatment of cancer by intravenous injections of colloidal lead has been abandoned practically everywhere. The quest for a vital dye to serve as a chemotherapeutic agent is being pursued in many European laboratories. The attempt to immunize against cancer is being tried by Lumsden in England and elsewhere in Germany. Warburg of Berlin has tried to suffocate the tumour by an atmosphere deficient in oxygen, and Sokoloff of Prague has tried to exhaust it with overbreathing. Both methods have been confined to local growths in mice. A series of criteria for judging alleged cancer cures is easily formulated, although compliance with its requirements is difficult. Histological diagnosis, cure of metastatic cases and permanent cures established by follow-up examinations, extending over five-year periods, should be applied to all alleged cancer cures. From this point of view immediate cures of local tumours in experimental animals, however intriguing, are false alarms. Serious and extensive clinical trial of any method by workers other than its advocate should await, first, the submission of the sections to substantiate the diagnosis in all cured cases; second, proof that the disease had progressed to dissemination at the time of treatment and, third, a five year follow-up to show the permanence of the cure.—*J. Am. M. Ass.* **94:** 326, Feb. 1, 1930.

Editorial

ON THE TREATMENT OF PNEUMONIA BY INHALATION OF CARBON DIOXIDE

IN the January number of the "*Archives of Internal Medicine*" Professor Yandell Henderson, in association with Doctors Coryllos and Birnbaum, members of the Cornell School of Medicine, present a paper in which they again call attention to the value of carbon dioxide in the early stages of pneumonia, and state that they secure by it deep breathing, with more complete ventilation of the lungs, and the relief of any atelectasis present.

In 1919 and 1920 Prof. Jonathan Meakins[1] in association with Professors Haldane and Priestley, of Cambridge, drew attention in two carefully prepared papers to the harmful effects of shallow breathing which exaggerated the uneven distribution of air to the alveoli and in which they ascribed the anoxæmia that occurs in acute lobar pneumonia to the shallow and rapid breathing associated with that condition.

During the past ten years many papers have appeared from Prof. Yandell Henderson and Dr. Haggard of Yale, emphasizing the great benefit to be obtained from the hyperventilation of the lungs induced by carbon dioxide in all cases in which we have to deal with collapse of the air cells; and the experience of many has proved the value of the method in the relief of carbon monoxide asphyxia, in the defective breathing of the newborn, and in the post-operative atelectasis so often followed by pneumonia.

In the present paper Professors Coryllos and Birnbaum again draw attention to the occurrence of pneumonia following upper abdominal operations in which the respiration has been more or less interfered with during the operation and is, for some days afterwards, limited in extent by the pain in the wound. The presence of any atelectasis induced in this way before actual infection takes place gives to the attack in their opinion the character of an occluded and undrained infection. Such pneumonia is referred to by them as a "pneumococcic atelectasis."

They also claim that in pneumonia due simply to infection, clinical evidence shows that in the early stage after infection a catarrhal condition exists which frequently chokes the airways with thick sticky secretion, and prevents efficient ventilation by the movements of respiration, thus inducing deflation and collapse of the air cells.

They consider that the atelectasis thus produced plays an important part in an attack by obstructing the normal channels of drainage. They report the results obtained in a series of experiments carried out on dogs to determine whether the deep breathing induced by the inhalation of carbon dioxide will actually open up the closed areas of the lung in early pneumonia. A virulent culture of pneumococci, type 2, was introduced through a bronchoscope into the right lungs of a series of narcotized dogs. A severe attack developed in the majority of the dogs thus treated; the animals not treated with inhalation of carbon dioxide died in a few days. If, however, shortly after the symptoms of pneumonia set in the animals were placed in an atmosphere containing from 5 to 7 per cent carbon dioxide, the collapsed and pneumonic areas of the lung cleared up to a large extent, and many made a complete recovery. At the meeting of the National Academy of Sciences held in Washington in April, 1929, Doctors Coryllos and Birnbaum[2] showed x-ray pictures of the animals with the early signs of pneumonic atelectasis, followed by pictures of the same dogs showing redistention of the atelectatic areas brought about by the deep breathing induced by inhalation of carbon dioxide. They claim that not only is atelectasis an important factor in pneumonia, but that inhalation of carbon dioxide proves an effective

1. HALDANE, MEAKINS, AND PRIESTLEY, *J. Physiol.* **52:** 420, May 1919; *Ibid.*, *Arch. Int. Med.* **25:** Jan. 1920.

2. *Science* **69:** 503, May 1929.

means of counteracting the atelectasis and reinflating the pneumonic lung.

In the present paper the writers report a group of 126 patients treated by the inhalation of 5 per cent carbon dioxide given by means of the inhalators usually employed in resuscitating asphyxiated patients. Of this group only 9 patients died, while a number recovered as by crisis shortly after the inhalation. The few deaths that occurred were all among those treated late in the attack. Unless the treatment is given early, conditions arising from the absorption of chemical and bacterial toxins become manifest and may lead to a fatal result. On the other hand, if an attack is treated early results are obtained which, in the majority of cases, are as effective as those attained in post-operative and post-asphyxial pneumonia. A.D.B.

PSITTACOSIS

SOME alarm seems to have been occasioned recently in the United States by an outbreak of psittacosis, a disease usually only met with at long intervals, an outbreak to which an undue amount of attention was given by the daily press.

The first reference to this disease, apparently, was in 1879, when Ritter[1] reported a house epidemic of a severe form of pneumonia, which he attributed to contact with parrots, or, rather, with the cages in which they had been shipped. Similar observations were made by Ost,[2] of Berne, and by Wagner,[3] of Leipzig, in 1882 and 1886. The most extensive outbreak of the disease, however, occurred in Paris, in 1892, when forty-nine cases were recorded, with sixteen deaths. The infection, for this it proved to be, was traced to parrots imported from South America, and was found to attack dealers in birds preeminently. The disease in the case of parrots takes the form of an epidemic enteritis, and Nocard,[4] who made full studies of it, isolated a micro-organism from the dried bone marrow of one of the affected parrots which, when fed to the birds, was competent to reproduce the disease. Nocard called the disorder "psittacosis," after "ψίττακος," a parrot. Since this time occasional cases have been reported elsewhere.[5,6,7,8,9] The disease was practically forgotten until last summer and autumn, when it appeared in widely separated regions. An outbreak occurred in Buenos Aires, with two deaths; twenty-eight cases were reported from Hamburg, Germany, with five deaths; four cases from England[10]: six cases from New York and vicinity: three cases from Warren, Ohio; several cases from Toledo, Ohio; with one death: and one case from Freeport, Pa. In all these cases the infection was definitely linked up, as before, with the handling of parrots.

In the case of man, psittacosis is said to resemble typhoid fever complicated with pneumonia. The onset is sometimes gradual, sometimes sudden, with weakness, malaise, headache, anorexia, nausea, constipation, and photophobia. The temperature rises rather rapidly, reaching 102° to 104°. There is muco-purulent sputum, which is sometimes blood-stained. Fine moist râles are heard throughout the lungs. With pneumonic symptoms, areas of consolidation can be made out in the lungs. The duration of the disease is from five to fifteen days.

Psittacosis may be mistaken for typhoid and paratyphoid fevers, for pneumonia and influenza. The differential diagnosis is not difficult if the possibility of the occurrence of psittacosis be borne in mind. A history of association with parrots will afford a valuable clue. The consolidation of the lung that occurs in psittacosis is not so typical as that in croupous pneumonia, and there is not the same leucocytosis. The respiratory symptoms characteristic of influenza are lacking in psittacosis. Unfortunately, the agglutination reactions are, in general, not

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3. WAGNER, *Deut. Arch. f. klin. Med.* **35**: 1882. *Ibid.* **42**: 1886.
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reliable, nor is the isolation of the incriminated organism from the affected parrot and from the human patient always possible.

The supposedly specific cause, *B. psittacosis*, of Nocard, belongs to the enteritidis group, and has close relationship with *B. Aertrycke* and *B. paratyphosus B.* Most, indeed, think that it is identical with the former. It should be said, however, that some doubt has been expressed as to the etiological relationship of Nocard's bacillus, both in birds and man, notably by Boehm, Selter, and Finkler[11], who attributed the pneumonia that occurs in man to a special form of streptococcus; and by Uhlenhuth, Haendel, and Schern,[12] who thought that Nocard's organism is the cause of psittacosis in parrots, but that its occurrence in man is not so well substantiated. The disease is now under investigation at the London Hospital, and the recent outbreak in the United States is being carefully followed up, so that it may be hoped that any doubt that remains on this matter will be finally removed. Now that communication is so free between distant parts of the earth, it behooves medical men, particularly those located in seaports and large centres of population, to be continually on the look out for rare and unusual diseases. Psittacosis is important, for the mortality in man is high.

A.G.N.

11. BOEHM, SELTER, and FINKLER, *Klin. Jahrb.*, **23**: 539, 1910.

12. UHLENHUTH, HAENDEL, and SCHERN, *Deut. Thierarztl. Wchnschr.*, **24**: 1909.

PRIMARY MALIGNANT DISEASE OF THE LUNG

THE interesting article by Dr. Ralston Paterson in this issue (p. 333), entitled, "The Relationship Between the Clinical and the Pathological Findings in Primary Pulmonary Malignancy," will serve to focus attention on a pathological condition that is becoming more and more important as time goes on. During the last decade the subject has come into relative prominence, particularly in America and Germany. Even a casual reference to the literature of the present day suffices to show that clinicians are impressed with the fact that primary malignant disease of the lung is rapidly becoming more common. Moreover, there are figures available which go to show that this increase is not only relative but absolute. It is safe to conclude, indeed, that the increase in this affection is not mere supposition but a fact. Figures can be adduced in support of this position. First, however, we should get some idea as to the frequency of primary cancer of the lung, for, while some authorities (*e.g.*, Moses[1]) say that it is not rare, the general impression has been that it is decidedly uncommon.

Combining the figures given by Weller[2], Huguenin[3], and Hanf[4] we have a total of 96,926 autopsies in which cancer of the lung was found 365 times, a percentage of 0.22. As to the relative frequency of primary cancer of the lung, as compared with cancer elsewhere, Ewing gives this as one per cent. The very instructive table given by Hanf, covering 30,380 autopsies, shows it as 4.83 per cent.

The important question as to whether primary carcinoma of the lung is more common than it used to be is not so easy of solution. The main source of information is in the paper of Hanf above referred to, which gives statistics from the Charité Hospital, Berlin, for twenty-two years, namely, from 1903 to 1925. Inasmuch as the number of autopsies recorded fluctuates considerably from year to year, with corresponding reflection on the figures for carcinoma, we may divide the time period roughly into two halves for purposes of comparison. During the first eleven years of the period there were 60 cases of pulmonary carcinoma (in 15,152 autopsies), and in the last twelve years (in 15,228 autopsies) there were 140. The marked increase noted during the latter half of the period might be explained to some extent on the basis that carcinoma generally is more common of late, but the discrepancy between the two periods seems to be too great to permit of this explanation. That the increase in the incidence of pulmonary malignancy is actual

is definitely proved, however, by the following table taken from Hanf.

PROPORTION OF LUNG CANCERS TO TOTAL CANCER

Place	*Period*	*Percentage*
Jena	1910 to 1914	2.2
	1915 to 1919	2.9
	1920 to 1924	8.3
Basle (Stæhelin)	.... to 1906	1.76
	1906 to 1914	2.9
	1914 to 1924	5.0
Berlin (Wahl)	1917 to 1922	6.0
	1922 to 1927	13.0
Zürich (Probst)	1906 to 1910	1.13
	1911 to 1915	3.34
	1916 to 1920	6.12
	1921 to 1925	7.17
	1926	7.56

Most cases of primary carcinoma of the lung occur between the ages of thirty and sixty, according to Adler[5]. The disease may, however, occur in quite young people. In Adler's experience 6 cases occurred between the ages of ten and twenty. All authorities are agreed that the affection is more common in men than women, in the proportion of about 3 to 1.

It is not yet apparent that the etiology of primary cancer of the lung is essentially different from that applying to cancer generally. One or two possible factors, however, call for some slight consideration.

Cancer is apt to occur at points where there is a transition of epithelium. While it would not be safe to be dogmatic on the point, it at least seems probable that pulmonary carcinoma begins in the bronchi, sometimes at the hilus, but sometimes deeper in, where the epithelium of the bronchi is changing into that of the infundibula and alveoli.

Some, like Ewing (*loc. cit.* p. 852) and Wolf, lay much stress on tuberculosis as an etiological factor. Wolf's figures, 31 cases in which 13 were associated with tuberculosis, prove nothing. The cases are too few to base such a conclusion upon, and, taking any large series of autopsies covering all forms of disease, gross evidences of tuberculosis can be found in at least 35 per cent of them, as we ourselves have found. It is true, however, that evidence of epithelial proliferation can be found microscopically, associated with the fibrotic changes found in chronic pneumonia and tuberculosis, but there is no certain proof as yet that this proliferation actually goes on to malignant overgrowth.

Anthracosis has been incriminated by some, and Ancke[6], long ago drew attention to the frequency with which malignancy attacked the lung in case of the miners of the Schneeberg district of Austria. Most of the cases, however, were classed at that time as sarcoma. Considering how common anthracosis is it is not clear that this condition has much to do with pulmonary malignancy.

Irritation, whether inflammatory in nature or mechanical, is regarded as one of the most important indirect causes of cancer, and it must be admitted that the lining membrane of the bronchi and lungs is particularly exposed to this kind of trouble. Bronchitis and influenza has been regarded by some as a predisposing factor, but the proof of this is quite lacking. The fact that men are more often engaged in dusty occupations than are women may account for the greater prevalence of cancer of the lung in the former. An interesting theory has lately been advanced, which, having in mind the undoubted fact that constant irritation of the skin by tar and paraffin can produce cancer, links primary carcinoma of the lung with the dust from the modern tar or asphalt road and the fumes of gasoline from the innumerable automobiles. Further study is required on this point.

A.G.N.

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GASTRIC FUNCTION AND PERNICIOUS ANÆMIA

FOR a long time the achlorhydria or achylia gastrica of pernicious anæmia has been suspected to be intimately associated with the etiology of the disease. Achlorhydria has been discovered in patients some years prior to the onset of the anæmia. Of greater significance is the report that pernicious anæmia has developed in several of the rare instances of successful total gastrectomy. A prevalent belief was that the absence of free hydrochloric acid in the gastric contents permitted the entry of viable micro-organisms into the intestinal tract and that the toxins produced by these was the cause of the disease. However, experimental evidence in support of such a theory has not been forthcoming, in spite of much enthusiastic research.

With the discovery of Minot and Murphy that liver or its aqueous extract was capable of producing a remission in the disease and of maintaining a normal blood level for an indefinite period, clinical and laboratory interest were focused upon that organ. More recently, however, Sturgis and Isaacs have shown that dessicated hog's stomach contains a principle, which, in corresponding amounts, is even more potent than that of liver in terminating the anæmia of the disease. About the same time Castle conducted a unique research which has an important bearing upon the same subject. He discovered that a mixture of normal human gastric juice and lean meat, incubated *in vitro*, and fed to patients suffering from pernicious anæmia had the same effect on the disease as had the feeding of liver extract or dessicated hog's stomach. He also found that when normal gastric juice and lean meat were incubated separately and each portion was fed to the anæmic patient at a different time, the effect on blood formation was nil. Castle naturally came to the conclusion that the blood-maturing principle could not be a product of the gastric mucosa. It appeared to result from the interaction of lean meat and normal gastric juice whether *in vivo* or *in vitro*. In the light of this investigation Sturgis and Isaacs suggested as a possible interpretation of their own experimental results with extract of hog's stomach that the hæmatopoietically active substance might have been liberated as a result of post-mortem digestion of the organ by the gastric juice. Sharp, on the other hand, is inclined towards a rather different interpretation of the problem. He points out that the liver and the stomach are intimately associated embryologically, the *anlagen* of both organs taking their origin from the primitive foregut, and that both undergo degenerative changes in pernicious anæmia. Liver feeding supplies an essential blood-forming substance in assimilable form which nevertheless, can be readily synthesized from ordinary food by normal gastric conditions. Because of the achylia the patient with pernicious anæmia is unable to build up this substance from ordinary food, but he can utilize what is readily available in normal liver. However, when he is fed hog's stomach extract the interaction of this substance with the ordinary food liberates the blood-maturing principle as in Castle's experiments with gastric juice and lean meat. The next step in the investigation would seem to be the determination of whether stomach extract acts favourably when given at a time when interaction of food is precluded.

Many difficulties are to be overcome before Sharp's theory can be accepted. There are no tests at the present time sufficiently accurate to demonstrate defective liver function in pernicious anæmia. Few of the cases which survive total gastrectomy have developed the disease.

Unfortunately, the discovery of an anti-anæmia principle in liver and in stomach extract has not entirely solved the pernicious anæmia problem. It is well recognized that degeneration in the posterior and the lateral columns of the spinal cord may make their appearance some time after the blood values have been restored by liver feeding, and these may become so marked as to lead to a fatal termination of the disease. Such cases belie the idea that liver is in any sense

curative. As yet it is too soon to say whether stomach extract will do more than liver in this respect. From present knowledge it would seem that the action of these substances is largely if not entirely upon the blood-forming tissues rather than upon the etiological agent responsible for the whole clinical picture of the disease. E. S. MILLS.

SICKNESS AMONG INDUSTRIAL EMPLOYEES

FOR many years Boards of Health have endeavoured to collect morbidity statistics of infectious diseases. These are often grossly inaccurate, unfortunately, and, even when approximately accurate, refer to only a small percentage of the sicknesses which afflict us. Public health officials and students of preventive medicine have been obliged, therefore, to fall back on mortality figures to determine the health problems of the community. These statistics, also, are unsatisfactory, for many important diseases do not appear in mortality records, and certainly the relative importance of a disease as a killer bears no relationship to its importance as a cause of disability. One can almost state as a fact the paradox that we do not die of the diseases from which we suffer.

The schools and the industries, naturally, constitute the best source of information on morbidity. In these places individuals are gathered together in smaller or larger groups, are under daily supervision, and are subjected to a certain amount of discipline; their comings and goings are known, and their sicknesses can readily be determined. For a number of years the United States Public Health Service has been tabulating data obtained from the sick benefit associations of a number of large industrial concerns. It has published these data from time to time. The latest publication on the subject* refers to the sickness experience of 165,000 industrial employees for the year 1927, and summarizes this experience for the years 1920 to 1927. Unfortunately, only disabilities causing eight or more days loss of time from work are considered.

Perhaps the most striking point brought out by these figures is the fact that diseases of the respiratory system, particularly of the upper respiratory system, constitute the most important problem in medicine today. These diseases, which are of negligible importance in death records, cause more economic loss and more inconvenience than any other group of diseases and are, apparently, as uncontrollable as they ever were. Numerically, respiratory diseases accounted for 41.8 per cent of the absences of eight days or more; if all absences had been considered the percentage would have been considerably higher. About one-tenth of these absences were due to the severe types of respiratory infections,—pneumonia and tuberculosis; nine-tenths of the respiratory diseases were of the so-called trivial nature, —colds, influenza, and tonsillitis.

Sex plays an important part in morbidity. Females consistently show a higher rate of absence. In this study the absentee rate for females was 50 per cent higher than for males, diseases of the respiratory, digestive, and nervous systems bearing particularly hard on the gentler sex.

Age is also of importance. The more advanced life periods show both greater frequency and greater severity of sickness.

Marked seasonal fluctuation in disease incidence occurs. This is, of course, common knowledge. In the northern latitudes the rate of absence from sickness in January, February, and March is usually double, and sometimes triple, that of July, August and September. This fluctuation is, to a large extent, due to the respiratory diseases, which are an insignificant cause of sickness in the summer months. Other diseases pursue a fairly even tenor during the year.

It is of rather gloomy interest to know that the experience of fifteen large sick-benefit associations, which had reported continuously from 1921 to 1927, shows no measurable progress in diminishing the extent of serious sickness among their members.

F. G. PEDLEY.

*U. S. Public Health Reports, Reprint No. 1266, Vol. 44, February 22nd, 1929.

A UNIQUE INNOVATION IN FRONTIER MEDICAL SERVICE IN AUSTRALIA

THE problem of maintaining an adequate medical service in the sparsely settled areas of Australia has been a matter of concern, and some of the details of a recent plan to meet this situation were discussed by a recent visitor to the Canadian Medical Association, the Rev. John Flynn, Superintendent of the A.I.M. Frontier Services in Australia.

There are large inland areas with incomplete means of communication and, in many cases, with very inadequate medical care, a situation which we, in Canada, can thoroughly appreciate. It has been found difficult to obtain doctors for many of these more isolated communities. As in Alberta, a number of lady doctors have gone into these pioneer settlements. At the present time, many communities find it necessary to subsidize a doctor. A frequent arrangement is the provision of an annual income in the neighbourhood of £400 with the right of private practice. The guarantee provided by the local committee is made up of free offerings, etc., plus a government grant on a two to one or one to one ratio.

With the idea of improving this frontier service, the Presbyterian Church in Australia recently began a scheme which has outgrown denominational limitations and is now receiving secular, State, and Commonwealth support. A system of travelling fellowships has been instituted. Twenty frontier posts have been selected as strategic locations and medical students in Adelaide, Melbourne, and Sydney are being interested in this work. As soon as these young graduates have had their interneship, they are sent to these outlying districts, and subsidized as is the custom. The rate has been raised somewhat, as the Board is now guaranteeing a total income of £500 to £600, the outlay of the Board depending upon the amount of other grants and private fees. At the end of one year these young men would be entitled to receive one year's post-graduate work in Europe, this study being financed by the Board as a travelling fellowship. It is hoped that, by this means, the frontier country will be served and that the men who participate in the work there will gain rather than lose prestige. Each man will have a district of approximately fifty miles radius.

To supplement this local service, an aerial medical service has been instituted in Queensland. The "flying doctor" covers a territory of four hundred mile radius, making contact with several other doctors located in frontier post stations. An aeroplane and pilot are maintained. The doctor chosen for this work must possess surgical skill and he functions as a surgical specialist and consultant to the other men in that field. Already this service has been very successful at Cloncurry, in Queensland, and it is now proposed that aerial posts be established in other parts of the country. The flying doctor is given the privilege of taking the fellowship course in Europe as well.

Inasmuch as telephone communication is not complete in many of these areas, a very ingenious wireless outfit has been devised for the use of these outpost doctors and nurses. A miniature transmitter and receiver, weighing but fifty pounds, has been designed for the use of these doctors and any settlers desiring to purchase them. Power is generated by a pedal arrangement adopting the principle of the bicycle pedal. At the doctor's base there is a telephonic wireless transmitter for outward messages. Incoming messages and replies are in Morse code. In these areas the authorities have permitted the sending of messages by untrained and unlicensed operators.

The principle of this system might very well be considered for certain parts of Canada. We have many pioneer areas where some such scheme of aerial medical service could be well utilized. The idea of providing scholarships to young men serving a period of time in these frontier posts is particularly interesting and, were the necessary funds available in this country, might well form part of our medical program. Mr. Flynn would like to see an Empire frontier service established, a service which would not only link up isolated areas in each country, but

which would be developed along similar lines in each country, would come under the general direction of a central board and, by virtue of the prestige and influence resulting from this Empire-wide organization would obtain funds which might not be available were each country to act independently. Such a scheme would require further thought, for, while the essential features of the plan would be applicable to all of the British Dominions beyond the seas, local conditions would so modify the *modus operandi* as to make direction by the country concerned almost imperative. HARVEY AGNEW.

Editorial Comments

THE MOTOR CAR AND INFECTION

It is not apparent, at first sight, that there is any particular relationship between the motor car and infection, and yet there is. When one considers the appalling sacrifice of life that attends the practice of motoring one is tempted to agree with those who regard the automobile as a juggernaut of destruction. On the other hand, were it not for the automobile, many thousands would be unable to enjoy the benefits of sunlight, fresh air, and the open country. Everything in life, apparently, as Herbert Spencer taught, has its compensations. One compensation, in addition to those just mentioned, is that in certain countries, and probably in many, the death rate from summer diarrhœa has declined since the motor car has become popular. In an interesting paper Graham-Smith* reviews the association of the common house fly with horse manure and summer diarrhœa, and also the relationship of Morgan's bacillus to enteritis in the lower animals. He makes the following statements. During the last twenty years the number of horses kept in the larger towns of England and Wales has decreased, probably by three-fourths, and, consequently, there has been a considerable diminution in the available breeding space for *Musca domestica*. Except in 1921, which was a hot year, the death rate from summer diarrhœa fell steadily from 1913 to 1922, when it reached the lowest level recorded. Since then it has remained at or near this level. Without attributing all of this improvement to the advent of the motor car, for some of it must be due to a better appreciation of the laws governing domestic and civic hygiene, still the fact remains that the considerable lessening in the amount of manure at large in the streets and farmyards must have its effect. It is, further, apparent that by the rigid enforcement of a simple and inexpensive method such as that devised by Baber in 1925 for destroying larvæ in manure, a method which does not impair the manure as a fertilizer, and which is also applicable to such garbage as is not incinerated, the number of flies could be reduced to a very low level. A.G.N.

* *J. Hygiene*, **29**: 132, 1929.

PHYSICAL METHODS IN RHEUMATISM

The suffering and national loss occasioned by the rheumatic group of diseases is ample justification for the prominence given to the subject in the January issue of the *British Journal of Actinotherapy and Physiotherapy*. This issue forms the "Annual Rheumatism Number," and is largely devoted to a consideration of the rôle of various physical agents in curing and alleviating rheumatic affections.

An introductory paper by Dr. Turrell, Oxford, deprecates too minute concentration in classifying and differentiating various forms of chronic rheumatism. He points out the two invariable factors in its causation, *i.e.*, a poison of varying virulence and a lowered local or general resistance, and he explains in a practical way the rôle of electrical methods in the restoration of the patient. Dr. van Breemen, Amsterdam, a leading Continental authority, takes up the subject of the use of artificial light therapy in rheumatic conditions, and shows how this must form an integral part of any considered scheme of treatment. Both ultra-violet and infra-red irradiation are of value in different cases.

A review of the many important uses of balneotherapy is given by Dr. Kerr Pringle, Harrogate, and the subject of mud packs and baths is considered by Dr. L. Schmidt, one of the leading physicians at the bath of Pistany. The possibilities of radio-active waters and brine baths are also dealt with, and a practical illustrated memorandum by Dr. Cochrane Shanks describes the part played by radiology in the diagnosis and control of rheumatic conditions.

An interesting paper by Dr. Margarethe Mautner describes the very extensive use which is made of physical methods in dealing with the problem of industrial rheumatism in Germany.

Each subject is dealt with by a leading authority, and the issue as a whole forms a review of the possibilities that will be found of great interest by all who are concerned with treating any form of rheumatism.

THE DOCTOR'S INCOME AND PREVENTIVE MEDICINE

An editorial on the Doctor's Income and Preventive Medicine appears in the January number of the *American Journal of the Public Health*. Falling death and morbidity rates compel recognition of the possibility that public health work is restricting the field of curative medicine. But the shrewd horse trader of years ago sold his livery stable and installed a garage. The physician of the kerosene oil era derived a large part of his income from the treatment of diphtheria and infantile diarrhœa. While income from these sources has been greatly reduced, the physician of the gasoline age has opportunity for more practice, and of a better kind. There are figures available to demonstrate the truth of this statement. In 1927, 82 cases of diphtheria were reported in the State of Michigan for every 100,000 of population. The income from treating 82 cases at $50.00 each would be $4,100.00. For every 100,000 of population in that state, in 1927, 2,200 babies were born. Immunization of each of those babies, at only $3.00 each, would have yielded an income of $6,600 in each 100,000 of population. And this takes no account of the pre-school and school children, who number respectively about four times and ten times as many as the babies.

The inference would appear to be that the doctor should take a leaf from the horse trader's book.

W. H. HATTIE

A MONEY GRANT TO THE CANADIAN NATIONAL COMMITTEE FOR MENTAL HYGIENE

Pleasing evidence of recognition of the opportunities and advantages which Canada offers in respect of social research comes in the announcement that the Canadian National Committee for Mental Hygiene is the recipient of a grant of $62,500.00 from the Julius Rosenwald Fund, of Chicago. The gift is to be used in the promotion of child study.

It is the policy of the administrators of the Rosenwald Fund to aid in the prosecution of social experiments which give promise of discovering methods which may be of such value to a community that they will be accepted as a basis for continued effort by the community. The fund withdraws its support at the conclusion of the period of investigation and demonstration, and naturally does not give support to an undertaking unless there is likelihood that it will become permanently established under community auspices. It may therefore be assumed that this gift to the Canadian organization is an expression of appreciation of the methods of our national Committee for Mental Hygiene, which is careful to formulate policies of so practical a nature that they may be reasonably certain of acceptance and continuation in every community concerned.

W. H. HATTIE

THE FATHER OF MODERN TROPICAL MEDICINE

Although Sir Patrick Manson has been dead almost ten years it is a notable and not altogether creditable fact that until recently no attempt has been made to perpetuate his memory in concrete form. It is true that his researches into the nature and causes of many tropical diseases, which have brought incalculable benefits to mankind, are such as to secure for him lasting fame, but, at the same time, it is fitting that service like his should receive the recognition and honour that all can see and read.

Like Sir James Mackenzie, Manson is a shining example of what a man imbued with talent, zeal, and industry can accomplish amid the exactions and distractions of private practice. A youthful graduate, twenty-two years of age, Manson went to Formosa in 1866, as medical officer to a group of merchants and missionaries. Here at once he found himself in a new world, about which he was not slow to enquire. Five years later, at Amoy, where he became medical adviser to the Chinese Maritime Customs, he began the systematic study of tropical diseases. He discovered the filarial worm in the blood in cases of elephantiasis, being at the time unaware that in this he had been anticipated, and, in 1878, suggested that the mosquito might play a rôle in the transmission of the infective agent, a hypothesis which became a fact through the researches of Bancroft, Low, James, Fülleborn, Labredo, and others. The same thought came to him in connection with malaria, but his return in England in 1890, when he became physician to the Seamen's Hospital and Lecturer on Tropical Diseases at St. George's Hospital Medical School, and in 1897 medical adviser to the Colonial Office, prevented him from following up this clue. He passed on the problem to Ronald Ross, whose brilliant confirmation of the suggestion is known to all the world.

It is pleasing to learn that at last subscriptions are being called for to establish a suitable memorial to Sir Patrick Manson. This

memorial is to take the form of a permanent home for the Society of Tropical Medicine and Hygiene, of which Manson was one of the founders, and of which he was the first president. It will bear his name. The Fellows of the Society, who are not wealthy individually or as a corporation, have set a fine example by subscribing £6,000 to the project. The £20,000 needed over and above this amount will no doubt be quickly provided by those outside the Society, for many besides medical men appreciate the great debt under which Sir Patrick Manson has laid humanity. A.G.N.

Special Articles

THE CORONARY CIRCULATION AND ITS RELATION TO CARDIAC ADAPTATION*

BY E. W. H. CRUICKSHANK, M.D., D.Sc., M.R.C.P. (Lond.), F.R.S. (Edin.)

Professor of Physiology, Dalhousie University, Halifax

The history of the development of our knowledge of the structure and function of the heart forms one of the most instructive and interesting chapters in the development of medical scientific knowledge. It is remarkable, however, that in any account of the work of anatomists and physiologists which culminated in those fundamental conceptions of the circulation of the blood little stress was laid upon the circulation within the heart muscle. Although no accurately quantitative work on the coronary circulation appeared in print until the beginning of the twentieth century, yet it is of interest to know that about the middle of the seventeenth century there is evidence of a keen interest in and controversy concerning the coronary blood flow. In the year 1689, Baptista Scaramucci[1] published an account of his researches on the coronary circulation, in which he stated that the intramuscular coronary vessels were emptied by contraction of the heart and that they were filled during diastole. These two hypotheses, so true as later evidence has shown, were strongly combated in 1707 by Stroem[2], who maintained that the reason for an absence of coronary filling during systole was that the coronary vessels were occluded by the flaps of the semilunar valves. It was a plausible hypothesis, which raised a controversy in which many well known scientific men of the eighteenth century took sides for or against the view of Stroem.

It would take too long to enter into a discussion of the various experimental methods devised to determine whether or not the coronary vessels were filled during systole or diastole. The most important evidence of the nineteenth century came from Langendorff[3], who showed, by relating aortic pressure changes to pressure changes within the coronary arteries, that contraction of the ventricles favours at its beginning the inflow of blood into the coronary arteries and then, according to the strength of contraction of the heart muscle, resistance is placed against the inflow, so that inflow is stopped about the middle of ventricular systole; and that, during diastole, resistance being reduced, the inflow is again favoured.

Another important feature of the investigations which have been carried out on the coronary circulation is that of the nerve supply of the coronary arteries. Sir Edward Shäfer[4], using the isolated heart of the cat and rabbit, stated in a paper published in the Festschrift für Pavlov in 1904 that, because stimulation of the vagus or accelerator nerves, or the administration of adrenalin, caused no alteration in the rate of flow in the coronary vessels there could be no vaso-dilator or vaso-constrictor nerve endings in these vessels. In 1923 Sir William Bayliss wrote in his monograph on the vaso-motor system:—"No satisfactory evidence of vaso-constrictor supply has yet been found for the heart, the blood supply of this organ is automatically varied in correspondence with its needs as the aortic pressure determines the blood flow through the coronary arteries; vaso-motor nerves to these vessels would seem superfluous." Since that date, however, much experimental evidence has shown that these vessels are richly supplied by both vaso-constrictor and vaso-dilator nerve endings. A great deal of this evidence has come from University College, London; the histological, from the laboratory of Professor Elliot Smith; the physiological, from the laboratory of the late Professor Starling.

A COMPARISON OF THE REACTION OF CORONARY AND SYSTEMIC ARTERIES TO TEMPERATURE AND DRUGS

That coronary and systemic arteries are richly supplied by both vaso-dilator and vaso-constrictor nerve endings can be seen from noting their behaviour to heat and drugs such as adrenalin[5]. The first and fundamental difference between these two types of vessels can be seen by examining a coronary and mesenteric vessel immediately after removal from the body. The former is flaccid, the latter rigid. If rings cut from these be suspended in a well buffered and oxygenated Locke-Ringer's solution, and the temperature of the solution be slowly raised to 37° C., it will be seen that the coronary artery steadily contracts;

*Abstract of paper read before the Halifax branch of the Medical Society of Nova Scotia, November 27, 1929.

the systemic vessel, after a slight contraction, occurring up to about 25° C., steadily relaxes. These temperature changes are reversible and show that vaso-constrictor nerve endings are present in the coronary arteries. If now adrenalin, in dilutions of 1 to 800,000, be added, the systemic vessel rapidly contracts, the coronary just as rapidly relaxes. This reaction of the coronary vessels to adrenalin has been amply demonstrated on the isolated mammalian heart by Anrep and his co-workers.[7] The conclusions to be drawn from such experimental evidence is that the coronary arteries are supplied, and that richly, by both sympathetic and parasympathetic, *i.e.*, vagus, nerve endings. Adrenalin, acting upon the sympathetic nerve endings, causes marked dilatation; heat acting on the parasympathetic causes definite vaso-constriction.

The Distribution of the Blood in the Coronary Arteries

In view of the interest which is being taken to-day in the question of coronary thrombosis it may be of interest to refer to recent work on this point. It has been shown that if the right and left coronary arteries be cannulated the percentage distribution of blood through them is as follows:—

Left Coronary:	Circumflex branch..	50	85
	Descending branch..	35	
Right Coronary:	Main branch.....	15	

This shows that the left ventricle receives by way of the branches of the left coronary some 85 per cent of the total blood flowing through the coronary vessels[7]. A paper by Parkinson and Bedford[8] on the clinical aspects of coronary infarction and thrombosis shows that the site of election for thrombosis is the left anterior descending branch, in the first 3 cm. of its course, and in a series of 55 cases the percentage distribution of the thrombotic condition was:—

	Circumflex branch....	18	
Left Coronary:	Ant. descending branch	45	68
	Main vessel.....	5	
Right Coronary:	.....	32	

The Relative Significance of Diastolic and Systolic Pressures in Determining the Coronary Flow

To determine the relative significance of these pressures as factors in the outflow from the coronary sinus, experiments have been carried out on the isolated heart-lung preparation of Starling[9]. By means of this preparation one can control blood pressure, venous inflow and pressure, temperature and heart rate. The procedures are as follows. First, a normal experiment is carried out, in which the coronary flow under normal blood pressure and suitable cardiac outflow is determined; secondly, by increasing the inflow from some 200 c.c. to 1200 c.c., and adjusting the artificial resistance in the schema, the diastolic pressure is kept constant and the systolic pressure raised; thirdly, the systolic pressure is maintained constant, while by increasing the inflow the diastolic pressure is lowered; and fourthly, the inflow is increased from 200 c.c. to some 1200 c.c., while by adjustment the artificial resistance the coronary outflow is kept as nearly constant as possible.

From a survey of the experimental data it is seen that neither systolic nor diastolic pressures are, *per se*, factors in determining coronary flow, and that the only factor which runs *pari passu* with changes in the coronary outflow is that of the true mean of the systolic and diastolic pressures. It is also seen that marked changes in pulse pressure, variations in heart rate and in venous inflow, play no part whatsoever in controlling the circulation within the coronary system.

The Reflex Control of the Coronary Flow and Its Relation to Cardiac Adaptation

Reference has already been made to the presence of nerve endings in the coronary arteries. In order to demonstrate the reflex control of these arteries it is necessary to perfuse the head of the animal at a pressure somewhat less than the systemic blood pressure, in order that the nerve centres in the medulla be kept in physiological tone[9]. If one increases venous inflow one finds an increase in the heart rate and in the coronary flow. The increase in cardiac rate is determined by the Bainbridge reflex[10]; a similar reflex mechanism occasions an increase in the lumen of the coronary arteries[11]. To exclude the factor of heart rate, one maintains the heart rate constant by single induction shocks at a rate greater than the maximum rhythm of the sino-auricular node. When this is done, increased venous inflow still produces an increased coronary outflow. The heart rate is thus excluded as a factor. If now the vagus be cut, any increase in venous inflow fails entirely to cause alteration in the coronary flow, thus showing that the vagus nerves subserve a reflex mechanism wherein afferent fibres from the right side of the heart, travelling to the cardio-inhibitory centre, diminish its tone, and also acting upon the sympathetic centre increase its tone, the joint result being an increase in the lumen of the coronary arteries with a corresponding increase in flow. It is clearly evident that there is a relation between the reflex control of heart rate and the control of the coronary circulation.

When a heart is called upon to do work it does so by increasing its rate, increasing its stroke volume, and increasing its coronary flow. The increase in stroke volume is a mechanical adaptation whereby in virtue of an increase in the diastolic length of the cardiac fibre the heart is enabled to build up greater tension within its fibres and to exert a greater force of contraction. In virtue of this increase in diastolic volume, which is evidence of physiological dilatation, the heart meets the extra demands put upon it. When in order to do this a heart shows pro-

gressive dilatation, then such a heart may be regarded as having passed from the physiological to the pathological state. While most of us know that the function of the heart is to pump out blood, and to supply the tissues with oxygen, few of us realize that the heart is essentially a respiratory organ and as such it must needs adapt itself to the oxygen requirements of the body as a whole. A heart is physiologically competent just so long as it continues to supply to the tissues that amount of oxygenated blood which is sufficient for their activities. If the demand for oxygen exceeds the supply it is almost invariably the heart which is at fault and not the lungs. Under conditions of stress and strain or of excessive exercise, according to the age and condition of the subject, it will be found that sooner or later the heart will become temporarily incompetent for its task of supplying oxygen to the muscles, and it is this incompetence which determines the time limits of the work which it may be called upon to perform. When the musculature of the body is thrown into action the call of the tissues for oxygen demands an increased output of blood from the heart, and in order that the heart may the more efficiently meet this demand it sees to it that its own musculature receives an increased supply of oxygenated blood.

And thus we see the value of a common reflex mechanism controlling heart rate and coronary flow, and further, in order that the reflex and central mechanisms of cardiac adaptation should function adequately, it is imperative that the heart continue to supply a sufficiency of fully oxygenated blood to the medullary centres. Thus in all conditions of stress and strain each and every system of the body is closely interrelated, and this interdependence of all the systems is largely due to their common dependence upon the heart for their oxygen supply.

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THE ULTRA-MINUTE CRYSTAL STRUCTURE OF ORGANIC SUBSTANCES AS REVEALED BY THE X-RAY*

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In his opening remarks the lecturer stated that he regarded the choice of a subject for an address in honour of Huxley as no light matter. Nevertheless, he hoped that an account of the recent researches carried on by the newer x-ray methods on the structure of living substances might be considered as in some measure suitable to the occasion. Although only at the beginning of these investigations, Sir William Bragg said it was already possible to recognize some important features of Nature's handiwork which hitherto had been hidden; and the future appeared to hold in store even more attractive revelations.

Sir William Bragg then went on to say that regarding atoms and molecules in the fluid or gaseous state our knowledge is relatively wide. Regarding the larger structures revealed to us by the microscope, we have gathered, under the stimulating demands of biology, much knowledge respecting the cell and its functions. Between these two ranges of investigations, however, there is a great gap which has been as yet very imperfectly explored. What is there, he asked, between individual molecules and structures only visible when they contain millions of molecules, but which fulfil complicated functions and manifest properties that depend on details of design for ever invisible to us. It is here that x-rays have put new means of investigation into our hands, which we are only now learning to handle.

This analysis of structures by means of the x-rays reveals two facts. The first is the remarkable and widespread tendency in Nature to a regularity of design in the arrangement of its molecules. This tendency, however, varies in power under varying conditions. Molecules are always drawn together, but the agitation induced by heat may prevent them from settling into position, as for example in a molten substance; or molecules may be surrounded by crowds of other molecules, which keep them apart and apparently act so as to reduce their mutual attractiveness, as when a substance is in solution. When, however, this tendency is free to develop, the molecules are found to pack themselves together in some regular pattern which is surprisingly simple. In a large number of substances, two, four, or some other small number of molecules are enough to complete the pattern

*Abstract of the Huxley Lecture on The Crystal Structure of Organic Substance in its Relation to Medicine, by Sir William Bragg, K.B.E., D.Sc., F.R.S.; Director of the Royal Institution of Great Britain, and of the Davy-Faraday Research Laboratory. *The Lancet* **2**: 1297, December 21, 1929.

which, repeated through space in all directions, forms the basis of the solid body, and is a powerful factor in the determination of its characters. This molecular arrangement gives rise to what has been termed "crystallization," implying by the term crystal a body, in which this definite arrangement is carried to such an extent that the resulting body becomes visible.

Minute crystals when they consist only of a few molecules are with difficulty revealed by the x-rays, but when a few score or a hundred of molecules have joined together in a crystal the x-rays are able not merely to show the regularity of arrangement which has come about, with various details as to its nature, but also to give a good idea of the size of the aggregates, each of which it is to be remembered is invisible even under the microscope.

This then is our first fact—this universal tendency to regularity in the arrangement of atoms and molecules as revealed by the x-rays; a fact of which we have only lately been able to perceive the extent. It exists not merely in the obvious crystal of salt or sugar, but is also present in such substances as fats and muscle fibres, hair and wool, cotton and silk, bone and shell. In each the properties are dependent on the structure. Each design has its importance, and must be studied, if we wish to know how the properties of any solid body are related to its composition. The modern subject of biochemistry has already made great progress in the establishment of a link between the two sciences from which its name is justly derived, but the hyphen between the bio and the chemistry is really a very long one, and this new range of inquiry is included.

A second fact on which we have to depend in our investigations is a phenomenon characteristic of radiations such as light or sound. When x-rays, which may be described as wave motions in the ether, pass through a body in which there is regularity of arrangement, part of the radiation is scattered in a manner characteristic of the arrangement. The scattering does not take place all round. It is sharply confined to a limited number of possible directions. By an examination of these directions it is possible to determine details of design. If there is no regularity there is no special limitation of direction. The theory of the phenomenon is well known to the student of physics, and there is no need to further describe it at present. All that has to be observed for our purpose is the fact that particular directions of radiation exist when there is regularity of arrangement among the sources of the secondary emission.

When the x-rays pass through a crystal each electron scatters a minute fraction of the incident radiation, and because the electrons on the average, even after allowing for any periodic movement, show regularities in their arrangement, the x-rays are scattered in certain directions only. Up to the present sufficient advance has been made in our investigation to enable us to read the simpler patterns, although the more difficult still baffle us. But the information is there in the x-ray picture to be deciphered as our knowledge increases. Furthermore, there is a special reason why the investigation into the regularity of the crystal is the province of x-rays, and not of visible light. The periodicities in the crystal are of the same order of magnitude as the wave lengths of the x-rays, which are some ten thousand times smaller than the length of the light waves. If this were not so, the whole investigation would fail.

The first application of this method of analysis was made fifteen years ago to the simpler and more obvious crystalline structures such as diamond, quartz, rock salt, and many others. Recently, the whole series of the silicates which form the bulk of the earth's crust has been analyzed, and their curious dependence on oxygen as the fundamental element of their structure has been laid bare. The forces which bind these salts together are patently electrostatic. Thus, for example, when sodium and chlorine are in juxtaposition each sodium atom loses a negative electron and each chlorine atom gains one. This action called "ionic" is very common in inorganic substances, but in organic substances the binding force is of a different kind and design. The x-ray analysis of the diamond shows a remarkable structure. Every carbon atom, and the diamond consists of carbon atoms only, is surrounded by four others arranged in the form of a tetrahedron. The distance from centre to centre of two neighbouring atoms is 1.54 Ängstrom units (one hundred million Ängstrom units are only equal to 1 centimetre). The bonds in the diamond, therefore, between atom and atom are of a different character altogether from those in rock salt, and are of far greater strength. These bonds bind atoms together into groups or molecules which offer great resistance to destruction. A diamond may be looked upon as one huge molecule of indefinite size and content, and its great hardness is a consequence of its structure. Graphite is another form of carbon in which the atoms are arranged in a different design and possess very different properties. The atoms are now linked together in sheets, as if they lay at the points of wire netting of the ordinary hexagonal character. The distance from atom to atom is a little less than in the diamond, but the sheets which are arranged like the leaves of a book are separated from one another by no less than 3.40 Ängstrom units. It is not known what keeps the sheets at this distance apart from one another any more than what sets the diamond distance at 1.54. The forces binding sheet to sheet however are less powerful than those binding atom to atom in the same sheet. One sheet may, with force, glide over another, and indeed graphite is an excellent lubricant.

While in the diamond strong bonds hold the carbon atoms together in all three dimensions, in graphite the bonds act in two dimensions only. A third form of structure exists in which the

stronger bonds appear to act only in one direction, forming a chain of carbon atoms; this form is common in substances entering into the formation of living bodies. The simplest known form of such a chain consists of a zig-zag of carbon atoms, the two atoms at either end being furnished with three hydrogen atoms. The x-ray analysis has been applied with great success to these structures at the Royal Institution. It is found that in them each carbon atom is again at a distance of 1.5 Ängstrom units from the next, from which we infer that a strong bond is in action.

The chemist has shown us that these carbon chains are to be found with many varieties of terminal. If we take away one of the three hydrogen atoms from one end and substitute an oxygen with the hydrogen attached to it, we have an alcohol. If we take away the remaining two hydrogens and replace them by a single oxygen we have a fatty acid. Changes may be made also in the size of the chains. An oxygen atom may be attached in place of two hydrogen atoms forming a so-called ketone. There is an immense number of different molecules, some long, and some short, fringed and terminated in different ways, but always there is the backbone of the single line of carbon atoms joined by the strong diamond bond.

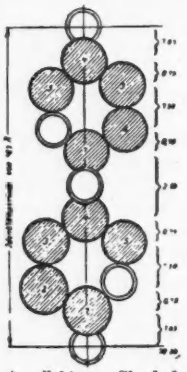
In some vegetable products the chains are of great length, as, for instance, palmitic acid with sixteen carbon atoms. The long carbon chain as a rule is characteristic of fats and oils.

Another series of substances found in living bodies presents problems which have proved more difficult. Especially was this the case in the investigation of the structure of cellulose of which the exact chemical formula had not been worked out at the time, and because its crystals were so minute. Nevertheless, success has at last been attained largely due to the work of Mark and his collaborators in Berlin and Ludwigshaven. The solution of this problem makes an important advance of value in the more complicated problems involved in wool, hair and muscle.

Chemists are familiar with carbon chains which are bent round to form rings One of the most important of these is the six-membered ring of benzene, the atoms of which are bound together by very strong bonds, and the x-ray analysis of which has shown the centre to centre distance of the atoms in the ring to correspond closely with the distance in the diamond, namely 1.5 Ängstrom units.

The backbone of the glucose molecule is also a chain of six carbon atoms joined together by bonds of strength similar to those in diamonds, with a curious linking of the first atom in the chain to the fifth by way of a single oxygen atom. The glucose ring accordingly must have much the same dimensions as the benzene ring. Two glucose molecules may be made to combine to form one molecule. The combination apparently is effected between the first carbon atom of one ring and the fourth of the other. One hydroxyl group in each of these atoms is broken up. Two hydrogens and one oxygen are removed forming a molecule of water and the remaining oxygen is linked between the two chains.

An x-ray diagram is not so easily obtained from cellulose as from a substance more simple in its crystallization, but careful technique has finally given results which afford an explanation of its structure. The x-ray diagram of a substance built of cellulose shows a perfect periodicity of 10.3 Ängstrom units, an imperfect periodicity of half that amount and a screw axis; by that is meant any one ring can be made to coincide with its neighbour by moving it 5.15 Ängstrom units along its line, and turning it round 180°. These x-ray diagrams tell us that cellulose chains lie side by side in little bundles in which these chains are arranged in regular fashion. Mark, of the Kaiser Wilhelm Institute, in Berlin, deduces that there may be twenty to fifty links in each chain, and that some score of chains go to the making of a bundle, which has received the name of a "micell." The picture may now be made fairly complete. The atoms form the glucose rings. The rings are linked together by strong bonds into a chain. The chains are drawn together side by side by much weaker forces into bundles or "micells". If a fibre thus composed is



Model of cellobiose.—Shaded circles represent carbon atoms; oxygen atoms are drawn as double rings to show the limits between which their diameters probably lie. This model, due to Mark, shows two glucose rings stripped of atoms unessential for the purpose of showing the method of combination, and joined together by an oxygen to form the kernel of the cellobiose molecule.

gradually stretched, the bundles will be brought first more or less into line, as shown by the x-ray diagram. After a slight stretching force, gradually applied to a fibre, there is complete recovery as soon as the stress is removed; small bundles may be pulled into alignment, but not with such force as to break any attachments. As the force increases some of the attachments are broken, but the bundles obtain the benefit of lying more nearly parallel to one another, and so of being in a better position to exert their sideways attachments. A still

stronger stretching force will cause the bundles to slide past one another, like threads dipped in some sticky fluid. It is notable that the spinning of a thread which is designed to place the fibres in such a way that they can resist being drawn past each other is exactly what is done on an exceedingly minute scale in the structure of the fibre itself.

We now proceed to consider what has been done towards the application of x-ray methods of analysis to animal substances. The x-ray examination of cellulose has been pressed forward in the interests of the textile industries in order to obtain a better understanding of the properties of cotton and artificial silk, and of hair and wool. Here the problem is more difficult because animal fibres are complicated mixtures of many constituents. Enough, however, has been accomplished to show that apart from certain characteristic differences there is a great similarity in the general behaviour and construction of the two. We have the well known fact that the behaviour of these two classes of fibre under stretching forces is very much the same. The effect of moisture and of heat are in the main parallel. It has also proved possible to obtain x-ray pictures of single fibres of hair and wool, and these show the same characteristics as cellulose. There are obviously small bundles of arranged molecules. Sometimes the bundles show disorder of arrangement, but in general the stretching of the fibre is accompanied by changes in the picture which show an increasing alignment. In general x-ray diagrams show the same sort of changes where wool is stretched or wetted or chemically treated as appeared in the cellulose diagram, allowing for the greater complexity of the case. There is an immense amount of work yet to be done before each of the wool constituents can be examined as to its structure, but there is little doubt that the same kind of arrangement exists in wool as in cotton, and what is found in wool and hair will surely be found in nerve and muscle.

Thus the suggestion forces itself on the mind that one and the same principle is in constant use by Nature to form living tissues which have strength and resilience, but which may also be overstrained and finally broken. The adjustment of the measures employed is a striking feature of the scheme. Sir William Bragg, in closing, stated that we may justly say that we have now in our hands a method of analysis which has not only confirmed previous results in a novel manner but has opened up new ways for the study of living matter.

Men and Books

AN IMPERIAL TRAGEDY

FREDERICK III AND THE LETTERS OF THE EMPRESS

BY J. W. S. MCCULLOUGH, M.D., D.P.H.,

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The death of the Emperor Frederick III, of Germany, on June 15, 1888, was the culmination of a tragedy marked by consequences of a most disastrous nature, not only to his Imperial Majesty's native country but to the whole civilized world. The Emperor was a Liberal, with an Empress, the eldest daughter of Queen Victoria, clever, highly educated, and imbued with the democratic ideas of her native land. There seems no doubt that if he had been spared, the course of Germany might have been deflected from the warlike avenue into which she was drawn by the autocratic policies of Bismarck and the Ex-Kaiser, which finally were the chief causes of the late war, the German revolution, and the present republican form of government of Germany.

The Emperor, in 1887, was a fine upstanding man of fifty-six years. He had had an enviable record in the wars of 1862 against Denmark, of 1866 against Austria, and of 1870-71, when he was chief of staff in the war with France. He succeeded his nonagenarian father, William I, as Emperor in March, 1888. It was not until January of 1887 that the Crown Prince as he then was, showed any sign of departure from the excellent health he had hitherto enjoyed, and the purpose of this essay is not to discuss the political affairs of Germany but to uncover the history of the Emperor's illness, interest in which has been once more aroused by the publication last year of the hitherto *lost letters* of the Empress Frederick.

The Empress and her husband had enjoyed a brief reign of but 98 days, when the latter died. As remarked by Ludwig, when the Emperor was known to be dying, a cordon of soldiers was drawn around the Imperial palace and the order was given that "no one in the palace, including the doctors, is allowed to carry on any correspondence with outside . . . If any of the doctors attempt to leave the palace they will be arrested."

To the foregoing statement of Emil Ludwig, historian of Kaiser William II, is added the following respecting occurrences following the Emperor's death:—"It was as though a monarch had been murdered, and his hostile successor, long prepared, had seized upon newly-acquired authority; troops were assembled, armed guards set, the palace was in the military sense hermetically sealed. Anyone who wished to leave had to have a permit viséd by the new Kaiser's A.D.C." It was apparent that the youthful Kaiser had assumed full authority and that his relations with his mother, the late Empress, were uncordial to the point of cruelty.

For ten years after the death of the Emperor, the Empress had enjoyed good health though her distress at the coldness of her son, the Kaiser, the insulting attitude of the German authorities and of the Press, which always referred to her as "that Englishwoman," and the loss of friends, who were for their own comfort obliged to "sail with the wind," was very great.

During her life in Germany, to which she went as a bride at seventeen years of age, the Crown Princess had kept up a constant correspondence with Queen Victoria and other English friends, which was continued during the period of her reign and subsequently. In these letters she was accustomed freely to discuss political affairs, to speak of her happiness in her married life, and to comment upon the character of the future Kaiser, for whom her great love was apparent, and upon Bismarck, between whom and herself there was mutual antagonism.

About 1898 she suffered from what was apparently lumbago, but probably was some malignant disease of the spine, which caused her death after unspeakable agony in 1901. A few days before her death she was visited by the late King Edward VII, her eldest brother, and with the King came his Equerry and Secretary, Frederick Ponsonby, a friend of long standing. To Ponsonby the Empress expressed a wish that he would take her letters to England and opportunity only allowed her to say that the letters would be sent to his room at 1 p.m. Ponsonby sat up late writing and promptly at one, four stablemen entered his room and to his consternation deposited two corded boxes the size of portmanteaux, covered with waterproofing, and left without uttering a word. He had expected a packet of letters which could be concealed in his bag. How should he be able to get these two extraordinary boxes out of the palace without attracting suspicion? Ponsonby decided to affect no concealment. He labelled the boxes, "China with care" and "Books with care" and shoved them outside his door in the corridor. Next morning, talking with the Kaiser in the main entrance of the palace, he watched with some trepidation out of the corner of his eye the dispatch of the boxes with his luggage. They reached England in safety, were sent to his home at Windsor, and there remained for twenty-seven years, and now only that the character and actions of the Empress, which have become the subject of adverse criticism, should be known to the world are they published. One would like to have been around the corner when they were read by the ex-Kaiser.

Among other matters of exceeding interest conveyed by the letters is the account of the Emperor's illness of one year and a half, and the striking testimony of the Emperor and Empress to the ability and care of Sir Morell Mackenzie, the English specialist who had charge of the Emperor during the last year or so of his illness. As already pointed out, the Emperor had, up to 1887, enjoyed excellent health. He had gone through three hard campaigns; he was strong, and looked well. In January of that year he first began to suffer from hoarseness, and his physician-in-ordinary, Surgeon-General Wegner, soon realized that these symptoms were sufficiently serious to warrant consultation, so Dr. Gerhardt, Professor of Medicine at the University of Berlin, on March 6, diagnosed a small growth on the left vocal cord, which he, after failure to remove surgically, burned down with the galvano-cautery, which was used perhaps ten or more times. As neither this treatment nor a sojourn at Ems sufficed to remove the hoarseness, Von Bergmann, an eminent surgeon of Berlin, a Russian (probably a Jew), was called in, and, regarding the growth as malignant, gave the opinion that it should be removed by the surgical operation known as thyrotomy involving the splitting of the larynx. This course was objected to by Bismarck, the Chancellor, and by the Emperor William I, then in his 90th year and also in a precarious state of health, suffering keenly, as he did, from renal colic. Bismarck arranged for a further consultation, which was attended by Wegner, Gerhardt and Bergmann along with Schröder, Lauer, and Professor Tobold, a senior Berlin laryngologist. Their opinion was that cancer was present and that the operation proposed by Bergmann should be performed. When Bismarck read this report he determined that the best European advice should be procured, and at his instance the German doctors sent for Morell Mackenzie of London.

There has been much controversy as to the question of who instigated the calling in of Mackenzie, and it was commonly supposed that the Crown Princess (the future Empress), was responsible for the summons of the English laryngologist to the bedside of her stricken husband. "Her distrust of German therapeutics," according to Ludwig, "has come to be responsible for his tragic and untimely end." The foundation for this erroneous view is to be found in statements circulated in the German press at the time and the subsequent testimony of Dr. Henry Semon, who quotes the private diary of his father, the late Sir Felix Semon, a German laryngologist of London. According to this version, the Crown Princess asked Wegner who he thought was the greatest throat specialist. Wegner, in reply, pointed to Dr. Mackenzie's text book, which had been translated into German and prefaced by Sir Felix Semon, who paid a great tribute to Mackenzie's skill. The Crown Princess then, according to the Semon version, telegraphed to Queen Victoria and requested her to arrange for the attendance of the English surgeon, and the Queen sent Sir James Reid, her physician, to make the arrangement. In a letter to *The Times*, dated January 25, 1928, Dr. Henry Semon goes on to relate that his father's unpublished manuscript states that "When Reid had delivered his message Mackenzie showed him the cable he had received from the German physicians, which requested him to start immediately for Berlin."

Sir Felix Semon also adds that when the Crown Princess had read his preface to Mackenzie's book she commanded Wegner to press for a consultation with Mackenzie, and the result was the official telegram to Morell Mackenzie from the German doctors.

While under ordinary circumstances it would be nothing but natural that the wishes of the wife of such a distinguished patient would desire the best advice obtainable, the well-known preference of the Crown Princess for things English, and her antipathy to German doctors, to whose want of skill she attributed the paralyzed arm of her son, the future Kaiser, the statement that she was responsible for Mackenzie's attendance was, in the ultimate result of the death of her consort and the controversy between the doctors, utilized to fasten upon her blame for the death of the Emperor. But Sir Rennell Rodd shows that early in 1887, at a luncheon in the British Embassy attended by the Crown Prince and Bismarck, when the British Ambassador, Sir Edward Malet, suggested the possibility of obtaining another opinion, the Crown Princess expressed her ignorance of who were the best authorities, and that after luncheon Bismarck told the Ambassador that arrangements had been made for the British specialist to come to Berlin. Furthermore, in the official report of the illness of the Emperor Frederick, published in 1888, it is made clear that the name of Morell Mackenzie *was first put forward by Wegner and accepted by Gerhardt and Bergmann.* The files of the *British Medical Journal* for 1888 contain all the official reports, as well as full accounts of the Emperor's illness and form interesting reading. The essential point is, that, according to all versions, the first request to visit the Crown Prince received by Mackenzie came to him from the German doctors and *it was upon this that he acted.*

Mackenzie arrived in Berlin on the 20th of May, 1887, and the next day after examination of the distinguished patient, announced to the doctors that he was not sure the growth was cancer and would not express an opinion as to operation until a portion was submitted to microscopical examination. Accordingly, he removed a tiny portion which was submitted for examination to Professor Virchow, a man of European reputation as a pathologist. Virchow was unable on this and two other occasions to discover any sign of cancer and from this point the views of the English and German doctors diverged. Bergmann and Gerhardt maintained that the clinical signs indicated cancer, Mackenzie could not agree until there was proof positive.

One can imagine the exciting situation. The German Emperor, William I, was already more than ninety years of age, in very indifferent health, and in the natural course of events could not for long sustain the burdens of sovereignty. The Crown Prince, his heir, would if he lived, succeed him. If the Prince were suffering from an incurable complaint would that render him incapable of exercising the power of the Crown? It was argued by many that the Crown Prince should be passed over in favour of his son, Prince William. Already the dread word "cancer" was being whispered far and wide, and it was certain that if the malady were pronounced malignant there would be those who would urge "that a sovereign who cannot speak should not rule." Rumours were current that the family laws of the Hohenzollerns barred the rule of an heir who suffered from an incurable disease, but this was denied by Bismarck. It was afterwards alleged that for this reason the Crown Princess was anxious that the Crown Prince's malady should not be diagnosed as cancer, and while she, no doubt, was desirous that her husband should live and reign, there is not a jot or tittle of evidence in favour of the slander. Mackenzie and the other doctors were given a free hand subject to the rightful wishes of the patient, and their opinions were unbiased and uninfluenced by the patient. All that the Crown Princess did, in fact, was what ninety women out of a hundred, English or German, would have done in her place, and that was to place her reliance in the specialist who gave the greatest hope for the complete recovery of the patient. The proposal to operate was abandoned after a favourable report upon a second portion of the growth by Virchow, not however without protests from Gerhardt and Bergmann. Gerhardt later alleged that during the operation for removal of a portion of the growth Mackenzie had injured the right vocal cord, and the latter was also accused of sending to Virchow a portion of the healthy right vocal cord. These accusations were, of course, strenuously denied by Mackenzie, and it is quite inconceivable that a man of Mackenzie's acknowledged skill and reputation should do either. Much of the difference of opinion over the Crown Prince's illness had its basis in the fact that medical science was at the time in a much more rudimentary stage than at present. The German doctors made a shrewd guess at the diagnosis. Mackenzie was cautious and desired proof. From this time forward Mackenzie and the German doctors were irremediably estranged, and Mackenzie wished to take the patient to England, a circumstance which coincided with the Crown Prince's determination to represent the Emperor at the jubilee of Queen Victoria which took place June 21, 1887.

As evidence of the German doctors' opinion Professor Gerhardt, on June 2, expressed himself to the Crown Princess as follows:—"I regard the matter with increasing anxiety. Where M. Mackenzie removed a small portion, it has grown again —the tumour is suppurating, etc. On the other side of the throat, the other vocal cord, which hitherto has remained healthy, is attacked—there is already a considerable amount of damage done. If Dr. Mackenzie cannot assist and cure it, there is no chance of recovery, save in the operation known as laryngotomy. It would have to be performed under far less favourable

conditions than would have been the case fourteen days ago. Therefore my only hope is that Dr. Mackenzie may be right in his opinion and that his treatment may be successful, for we have nothing else to suggest." All this was cold comfort for the Crown Princess, and by no means commendatory of Mackenzie. The Crown Princess, the German Emperor and Empress and Bismarck all knew of the divergence of opinion, and anyone of them might have supported Gerhardt and Bergmann and demanded an operation. However, they left it to the doctors. The Germans produced statistics to show that in 7 out of 10 cases of the kind an operation was successful; while Mackenzie, supported by Virchow's opinion as to the non-malignancy of the growth, believed he might be able to effect a cure in two months.

On the 8th of June Mackenzie removed another portion of the growth, and after examination Virchow reported, "In spite of the most careful examination no single portion was detected which has been pathologically changed sufficiently to make this worth mentioning . . . In any case there is nothing in them (portions submitted) that could arouse the suspicion of further and more serious disease." The Crown Prince was now feeling in excellent health, and the royal party journeyed to England, accompanied by Wegner and Landgraf (Professor Gerhardt's assistant) of whose professional ability Mackenzie had a very poor opinion. On June 21, the Crown Prince rode in the Jubilee cavalcade of thirty-two princes, "a towering Lohengrin-like figure, in the white uniform, silver breastplate, and eagle-crested helmet"—a tragic figure, outwardly the embodiment of princely grace and splendour, but inwardly conscious that if his malady was indeed cancer, his span of life was drawing to a close.

The next two months were spent at Norwood, then in the Isle of Wight and in Scotland, and during this period Dr. Mark Hovell, senior surgeon to the Throat Hospital, was called in consultation. Then, chiefly because of the clamour in Berlin and the failing health of the Emperor, the royal party left England and went to the Tyrol, accompanied by Dr. Hovell who was shortly afterwards joined by Major Schröder, Surgeon-in-Ordinary to the Crown Prince. Whilst in the Tyrol the Crown Prince's health seemed to improve, and in many journals, both German and British, Mackenzie was lauded as the man who had saved the Crown Prince from a dangerous and unnecessary operation. From the Tyrol the scene shifted to Venice where the weather was warmer, thence to Baveno, where the patient was seen by Mackenzie, who according to the Crown Princess, expressed himself to the effect that the patient "was getting on nicely, but said that he must avoid talking and cold and damp—if so, he may be quite well in three or four months."

In November the Crown Prince was moved to an Italian villa, the Villa Zirio at San Remo, where there were tragic events in his illness. The story of this sojourn is graphically told in the Memoirs of De Blowitz, the Paris correspondent of the London Times, who is very scathing in his report of the conduct of Prince William (the future Kaiser), whose attitude seemed to be that his father was doomed and that he, the Prince, was entitled to succeed his grandfather.

Within twenty-four hours after his arrival at San Remo the Crown Prince became much worse and Mackenzie was sent for and from November 6, 1887, until the end never left his patient. Mackenzie now appeared to realize that the disease was more serious than he had thought, and to the anxious enquiries from the Crown Prince if he thought the malady were cancer, replied:—"I am sorry to say, Sir, it looks very much like it, but it is impossible to be certain."

The consultation which now took place between Sir Morell Mackenzie, who, in the interval had been knighted by Queen Victoria, Professor Von Schrötter, Dr. Krause, and Dr. Morris Schmidt, who was sent by the Emperor, destroyed the last vestige of hope. As a result of this consultation the Crown Prince was given choice of total removal of the larynx or tracheotomy. He chose the latter. On November 12th the official German Gazette announced that "the disease is due to the existence of a malignant new growth of a carcinomatous character." The next day the Emperor summoned Gerhardt, Tobold, Schrötter, Lenthold, Morris Schmidt, and Landgraf to Berlin to answer two questions. To the first, as to whether in spite of the Crown Prince's refusal, the radical operation of the removal of the larynx should be advised, they replied that the patient's will must be decisive in view of the danger of the operation, and that no further attempt should be made to persuade him. To the second, as to why, when the operation had been abandoned in May and June, it was suggested again at so late a date, they replied that the responsibility for its non-performance until too late had been incurred by that physician, who had overlooked, nay, even denied, the increase of the growth. After considering this report, the Crown Prince again decided against the operation, but the onus of delay was placed on Mackenzie, and there was a storm of professional and public opinion against him.

All the world was now interested in the unusual event of an Emperor and his heir-apparent both on the threshold of death. The agonizing race with death had begun. The German press endeavoured to demonstrate to a public already receptive of such news that the Crown Prince would be sacrificed because of the mistake of an English doctor called in by the Crown Princess. German doctors who had been correct in their opinion had been deliberately set aside in favour of an incompetent foreigner. Prince William, hitherto in favour of Mackenzie, was not slow to reflect Berlin opinion, and arrived at San Remo

with Dr. Schmidt, apparently on the *qui vive* to his own early chances of succession. According to a letter from the Crown Princess to her mother, who had enquired "how Willy was at San Remo," the Crown Princess said "he was as rude, as disagreeable, and as impertinent to me as possible when he arrived, but I pitched into him with, I am afraid, considerable violence and he became quite nice and gentle and amiable (for him)." Not only did the Crown Princess suffer from the impertinence of Prince William (the future William II), but to add to her distress there arrived the second son, Prince Henry, who offensively announced to his father, the Crown Prince, that the Emperor had, without consulting him, deputed Prince William to sign all state papers while he was unable to do so.

There were strenuous efforts made to replace Mackenzie, Hovell, and Krause by other doctors. Bramann, Bergmann's assistant, arrived at San Remo to perform the operation of tracheotomy should it suddenly become necessary. All these proceedings were a continued source of distress to the already burdened wife, which was shown by her reference in the letters where she says, "Henry maintains that his papa is lost through the English doctors and me."

An illuminating letter in respect to Mackenzie is that by Lady Ponsonby, wife of Sir Henry, the Queen's Secretary, in December, 1887, wherein she says:—"I have just had a long visit from Baron Roggenbach, an old friend of the Prince, who tells me he was one of the first to be alarmed about the Crown Prince and who told me the history of the case from the beginning. Whatever his opinion of Mackenzie is *at home*, and it does not seem to be favourable, he thinks he has behaved honourably and straightforwardly here. He quite agrees with him that the operation at any time was out of the question, whether the evil was cancer or no, so that he (Mackenzie) was justified in saying, so far as evidence went at first, there was nothing to prove it malignant. He never disguised from the Crown Prince it might become so."

January and February of the New Year (1888) passed away and early in February, the disease having now been diagnosed as perichondritis, it was decided to insert a cannula into the patient's throat, so as to render the breathing somewhat easier. The operation of tracheotomy was successfully performed under chloroform by Bramann in the presence of Sir Morell, Drs. Hovell, Krause and Schröder. Towards the end of the month there was a consultation between Mackenzie, Bergmann, Schröder and Professor Kussmaul of Strassburg. There was a divergence of views communicated to the anxious Crown Princess. Bergmann said:—"He will never recover from the state he now is in! He can only rapidly get worse." Kussmaul declared the condition was cancer. Mackenzie said:—"The first pathologist in the world has found nothing of the kind! What I see in the larynx points in the opposite direction—both these things make it impossible for me to affirm that it is cancer. Cancer may be there, but I have no convincing evidence! I know more about the throat than these gentlemen who are, one a celebrated surgeon, the other a general physician who chiefly treats complaints of the stomach, and Virchow's microscopical examination seems to me more reliable than that of Bergmann, Bramann, Krause, and Schröder!"

So far Mackenzie was apparently on safe ground. Previous to his arrival no throat specialist had examined the patient. The German doctors were, no doubt, able men so far as their respective spheres of practice led them. They relied upon appearances, made a diagnosis of cancer, and resolved on an operation, of doubtful value even in cancer cases, whose mortality was high, and which even if successful would forever prevent the subject from again using his voice. Mackenzie, in his day, perhaps the highest authority in throat affections, came at the instigation of Prince Bismarck and on the advice of Wegner, one of the German doctors, and with the consent of the others. Not being satisfied that the growth was cancer he on three occasions had portions examined by an eminent pathologist who insisted on each occasion that no evidence of cancer could be found Mackenzie therefore refused to admit the presence of cancer until proof of its existence was forthcoming and it must be admitted that he played on the uncertainty of diagnosis for all it was worth. The fact remains that although the guess of the German doctors eventually proved to be right, Mackenzie based his opinion on scientific analysis which proved to be misleading.

On March 9, 1888, William I, the nonagenarian Emperor, died, and there began the brief ninety-eight days' reign of the Emperor and the Empress Frederick. They had won the race with death. The new Emperor was in his fifty-eighth year, and still, despite his terrible illness, a dominating figure and still mentally alert. His first act was to write out the announcement of his own succession as Frederick III. His next was to invest the Empress with the ribbon of the Black Eagle, the highest order within his gift. He then wrote for Sir Morell Mackenzie the words: "I thank you for having made me live long enough to recompense the valiant courage of my wife," proving that, whatever others might say, his confidence in the English surgeon was undiminished. This consolation, not unprized among doctors, remained until the end. Mackenzie always retained the confidence of the Emperor and his Consort.

The scene now shifts to Berlin, where, for State reasons, the presence of the new Emperor was imperative. The journey was uneventful and the Emperor Frederick energetically applied himself to his new labours. Two days sufficed to send him to bed, but in spite of this he continued bravely to carry on until the end. Among his first acts was the request that Bismarck continue as Chancellor, and the concluding

sentence of letter read "Not caring for the splendour of great deeds, nor striving for glory, I shall be satisfied if it be one day said of my rule that it was beneficial to my people, useful to my country, and a blessing to the Empire."

In April the health of the Emperor had undergone no improvement; indeed it had been aggravated by the hand of Bergmann. On the morning of the 12th the Emperor was seized with an attack of coughing, which slight adjustment of the cannula had relieved. At 8 a.m. it was decided by Mackenzie, Krause, and Wegner that a shorter tube might be better. The result was not satisfactory and Mackenzie proposed the use of a new pattern and asked Bergmann to be present. Bergmann took out the shorter cannula and inserted the new one. This started up the coughing and a severe hæmorrhage. Again Bergmann tried and the tube had to be withdrawn with the result of renewed coughing and streams of blood. Bramann was called in and inserted a moderate sized cannula with ease. Bergmann's roughness annoyed the Emperor, and as a result he retired from the case. Sir Morell and Hovell were much incensed by the resulting bitter and unfair attacks upon them in the German press and prepared an answer but on the advice of the Empress the statement was withheld for the time.

There continued to be trouble with William, the new Crown Prince, of whom the Empress, on May 12, wrote to the Queen, "William fancies himself completely the Emperor—and an absolute and autocratic one! He is in a coterie whose main endeavour is, as it were, to paralyze Fritz in every way."

The condition of the Emperor gradually became worse. He suffered severely though he pluckily stuck to duty till almost the last moment. He was worn to a skeleton, his hair became thin and his throat a shocking sight. He died at 11 o'clock on June 15, 1888. Immediately upon the Emperor's death, as already pointed out, his late palace became a sort of prison for the Empress, the doctors, and all her entourage, until on the following day the Empress fled to her farm at Bernstedt. It was as though she were the State's worst enemy; her ill treatment on the part of the new Kaiser, William II, her own son, and of Bismarck, was of the most atrocious character.

The flood of German animosity descended not only upon the head of the unfortunate Empress, but upon the English doctors and upon the memory of the late Emperor. The Bismarcks, father and son, heaped disparagements upon the dead man's name. Count Herbert Bismarck spoke of the Emperor Frederick as an "incubus" and an "ineffectual visionary." In conversation with the Prince of Wales (afterwards Edward VII) he bluntly suggested that "an Emperor who could not talk was unfit to reign." In the memoirs of the ex-Kaiser, who eventually suffered the extreme humiliation of defeat and exile at the hands of the Allied Armies, he says:—"The tragic element for me in the matter of Bismarck lay in the fact that I became the successor of my grandfather,—in other words that, to a certain extent, I skipped a generation." It would have been a happy thing for Germany, nay, for the entire world, had a generation skipped him.

Bismarck now let it definitely be known that it was his opinion that had the German doctors been entrusted with the care of the late Emperor, events might have had a happier sequence. Sir Morell Mackenzie was abused far and wide, and the main indictment in that abuse was that he had been selected by "that Englishwoman" the Empress Frederick. Bismarck conveniently forgot that it was at his suggestion the English doctor was brought in. There were on the one side the assertions of the German doctors that they alone were right, that their diagnosis had been confirmed, and that the treatment of the case, taken out of their hands, was bungled by Mackenzie. On the other, there was a statement by Mackenzie and Hovell of the clinical history of the case, including Mackenzie's official report presented to Bismarck at his request. All these reports, as well as that of the post-mortem, are published in the issues of the *British Medical Journal* of 1888. The controversy was acute and showed on both sides not a little of personal animosity. Perhaps the best and fairest summary of the situation may be gleaned from an editorial in the *British Medical Journal* of June 23, 1888. After commenting on the tragic illness of the late German Emperor and his heroic submission to the inevitable, the article disclaims any intention to discuss the political aspects of the situation; it confines itself to the medical side of the question.

While the disease of the Emperor was at an early date judged by the German doctors to be malignant, the *Journal* judges that their opinion was in part a suspicion, bred by the over-anxiety engendered by the transcendant importance of the case rather than a logical conclusion drawn from the observed facts. "It is inevitable," says the article, "that regret should now be felt by many that an operation which offered the only chance of eradicating the disease was not attempted when possibly there was yet time; but taking all the circumstances into account, it is difficult to see how any other course could properly have been adopted than that which was actually chosen." The diagnosis was at best doubtful, while the immediate risk was certain, and the prospect of a permanent cure, if the suspicion as to the nature of the disease proved to be well-founded, was very slight. The illustrious patient had made up his mind not to submit to any operation that might shorten his life or destroy his voice. This decision, made independently of medical advice, was no doubt strengthened by the negative results of Sir Morell Mackenzie's clinical and of Professor Virchow's pathological examinations.

At a later period, when the worst fears seemed

to be confirmed, there were still elements of uncertainty. The visible healing of ulcerated surfaces, the widespread inflammation, the exfoliation of cartilage and the general predominance of necrotic processes over the formation of new growth, continued to make up a clinical picture very unlike ordinary cancer of the larynx. The microscopic evidence was differently interpreted by different authorities.

Even in the lowliest patient the expediency of operation, which may prove more rapidly fatal than the disease, is not to be determined from the surgical standpoint. In the case of the Emperor there were other considerations which he himself looked upon as of far greater importance and on these, rather than on a regard for his own ultimate recovery, he, with a full knowledge of what he was doing, decided to take his stand. From this view it is sufficient to justify the course adopted if it can be said that it was not positively unsurgical. At the time the results of such operations were ghastly. Such an experiment would have been of the rashest kind. The "expectant" treatment was adopted in accordance with the expressed wish of the patient. It is no secret that the result was considered by those most directly interested—including the Emperor himself—fully to justify the course that was pursued.

The *Journal*, while deploring the professional squabble that ensued, expressed itself confident that all did, or tried to do, what they believed best in the interest of the patient and urged since the medical profession is the most truly cosmopolitan of human institutions that the unseemly disputes should be buried in the grave of the illustrious patient, who was, above everything, a lover of peace.

Association Notes

BRITISH AND CANADIAN MEDICAL ASSOCIATIONS

Winnipeg, August 26-27-28 and 29, 1930

Special Tours

A NUMBER of tours have been arranged in connection with the forthcoming visit of the British Medical Association to Canada, which will enable the members from overseas to make short visits to some of the chief cities in this country, and, also to make the acquaintance of the Great Lakes. The schedules are given herewith. Tours "A," "B," and "C" are to be taken on the way to Winnipeg, starting from the port of arrival, Montreal, or Quebec. Tour "D" is a special tour to the Maritime Provinces, and is to be taken after the meeting in Winnipeg, starting from Montreal. In each case the cost of the Tour is given. The charges include all reasonable outlay (other than personal expenses for wines, liquors, and such creature comforts) but do not cover the expenses of the four or five days of the meeting in Winnipeg. If Tourist Third Cabin be selected there will be a reduction of £15.7s., or, if Third Class, £25.10s., on Tours "A," "B," and "C."

TOUR "A"

PROPOSED ITINERARY FOR SHORT TRIP—28 DAYS

Arr.	Montreal		p.m.	Fri.	Aug.	22	C.P.SS.	Motor to Windsor Hotel. Motor drive around city.
		(Montreal Sat. Aug. 23)						
Lv.	Montreal	10.15	p.m.	Sat.	Aug	23	C.P.R.(1)	
		AT FORT WILLIAM JOINS WITH OTHER TOUR "B" WHICH ARRIVES ON GREAT LAKES' STEAMER, MORNING OF AUGUST 25th:						As an alternative we suggest a stop over of 3 hours to drive around Port Arthur and Ft. William, thence by special train to Winnipeg.
Arr.	Winnipeg	8:45	p.m.	Mon.	Aug.	25	C.P.R. Spl.	

AT WINNIPEG ROYAL ALEXANDRA HOTEL

ATTENDING CONVENTION, AUGUST 26, 27, 28 & 29

Lv.	Winnipeg	10.00	p.m.	Fri.	Aug.	29	C.P.R.	Great Lakes Special.
Arr.	Ft. William	10.25	a.m.	Sat.	Aug.	30		
Lv.	Ft. William	12.20	p.m.	Sat.	Aug.	30	C.P.SS.	Great Lakes.
Arr.	Sault Ste. Marie	9.00	a.m.	Sun.	Aug.	31	C.P.SS.	(Attend church, if desired).
Lv.	Sault Ste. Marie	1.00	p.m.	Sun.	Aug.	31	C.P.SS.	
Arr.	Port McNicholl	8.00	a.m.	Mon.	Sept.	1		
Lv.	Port McNicholl	8.15	a.m.	Mon.	Sept.	1	C.P.R.	
Arr.	Toronto	11.45	a.m.	Mon.	Sept.	1		Stay at Royal York Hotel. Sight-seeing drive around Toronto. Visit Exhibition.
Lv.	Toronto	9.00	a.m.	Wed.	Sept.	3	C.N.R.	
Arr.	Ottawa	4.15	p.m.	Wed.	Sept.	3		Walk to Chateau Laurier. Drive around city.

IN OTTAWA JOIN TOUR "B"

Lv.	Ottawa	3.00	p.m.	Thurs.	Sept.	4	C.N.R.	
Arr.	Montreal	6.00	p.m.	Thurs.	Sept.	4		Drive to hotel.
Lv.	Montreal	10.00	a.m.	Fri.	Sept.	5	C.P.SS.	

COST OF THE ABOVE TRIP—$222.75

TOUR "B"

PROPOSED ITINERARY FOR SHORT TRIP—35 DAYS

Arr.	Quebec		a.m.	Fri.	Aug.	15	C.P.SS.	Drive around city. Lunch and dinner at Chateau Frontenac. Dance at Hotel.
Lv	Quebec	8.00	a.m.	Sat.	Aug.	16	C.P.SS.	
Arr.	Montreal	8.00	p.m.	Sat.	Aug.	16		Drive to Windsor Hotel. Drive around city. Visit Hospitals.
Lv.	Montreal	12.45	p.m.	Tues.	Aug.	19	C.P.R.	
Arr.	Toronto	8.45	p.m.	Tues.	Aug.	19		Walk to Royal York Hotel.
Lv.	Toronto	8.15	a.m.	Wed.	Aug.	20	C.SS.L.	
Arr.	Lewiston	11.10	a.m.	Wed.	Aug.	20		Stay at Clifton Hotel, Niagara Falls. (Electric Line around Falls).
Lv.	Niagara Falls		p.m.	Thurs.	Aug.	21	Motor	
Arr.	Toronto		p.m.	Thurs.	Aug.	21		Royal York Hotel. Drive around city.
Lv.	Toronto	12.40	p.m.	Sat.	Aug.	23	C.P.R.	
Arr.	Port McNicholl	4.10	p.m.	Sat.	Aug.	23		
Lv.	Port McNicholl	4.30	p.m.	Sat.	Aug.	23	C.P.SS.	
Arr.	Sault Ste. Marie	11.00	a.m.	Sun.	Aug.	24		
Lv.	Sault Ste. Marie	12.30	a.m.	Sun.	Aug.	24		(Join Tour "A")
Arr.	Ft .William	8:10	a.m.	Mon.	Aug.	25	C.P.SS.	
Arr.	Winnipeg	8.45	p.m.	Mon.	Aug.	25	C.P.R. Spl.	
Lv.	Winnipeg	10.00	a.m.	Sat.	Aug.	30	C.N.R.(2)	Stop over 24 hours on train or at Lodge
Arr.	Minaki	1.25	p.m.	Sat.	Aug.	30		
Lv.	Minaki	1.25	p.m.	Sun.	Aug.	31	C.N.R.(2)	
Arr.	Timmins	3.00	p.m.	Mon.	Sept.	1	T. & N.O.	Visit mines.
Lv.	Timmins	11.40	a.m.	Tues.	Sept.	2	T. & N.O.	
Arr.	Ottawa	5.05	a.m.	Wed.	Sept.	3		Walk to Chateau Laurier. Drive around city.

JOIN TOUR "A"

Lv.	Ottawa	3.00	p.m.	Thurs.	Sept.	4	C.N.R.	
Arr.	Montreal	6.00	p.m.	Thurs.	Sept.	4	C.N.R.	Drive to Windsor Hotel.
Lv.	Montreal	10.00	a.m.	Fri.	Sept.	5	C.P.SS.	Drive to steamship.

NOTE: Tours "A" and "B" will travel together from Ft. William, a.m., August 23rd, to Winnipeg, same evening; also join again in Ottawa, September 3rd, and from there to England.

COST OF THE ABOVE TRIP—$298.20

TOUR "C"
PROPOSED ITINERARY FOR LONG TRIP—49 DAYS

Arr.	Quebec		a.m.	Fri.	Aug.	15	C.P.SS.	Drive around city. Lunch and dinner at Chateau Frontenac. Dance at hotel.
Lv.	Quebec	8.00	a.m.	Sat.	Aug.	16	C.P.SS.	
Arr.	Montreal	8.00	p.m.	Sat.	Aug.	16		Drive to Windsor Hotel. Drive around city. Visit Hospitals.
Lv.	Montreal	12.45	p.m.	Tues.	Aug.	19	C.P.R.	
Arr.	Toronto	8.45	p.m.	Tues.	Aug.	19		Walk to Royal York Hotel.
Lv.	Toronto	8.15	a.m.	Wed.	Aug.	20	C.SS.L.	
Arr.	Lewiston	11.10	a.m.	Wed.	Aug.	20		Stay at Clifton Hotel, Niagara Falls. (Electric Line around Falls).
Lv.	Niagara Falls		p.m.	Thurs.	Aug.	21	Motor	
Arr.	Toronto		p.m.	Thurs.	Aug.	21		Royal York Hotel. Drive around city.
Lv.	Toronto	9.00	p.m.	Fri.	Aug.	22	C.N.R.	
Arr.	Timmins	8.25	p.m.	Sat.	Aug.	23	T. & N.O.	Visit mines in vicinity.
Lv.	Timmins	4.00	p.m.	Sun.	Aug.	24	T. & N.O.	
Arr.	Winnipeg	8.15	p.m.	Mon.	Aug.	25	C.N.R.	

(AT WINNIPEG CONVENTION 26, 27, 28 AND 29th)

Lv.	Winnipeg	10.15	p.m.	Fri.	Aug.	29	C.N.R.	Drive around city. Visit points of interest.
Arr.	Saskatoon	12.20	p.m.	Sat.	Aug.	30		
Lv.	Saskatoon	10.00	p.m.	Sat.	Aug.	30	C.N.R.	
Arr.	Edmonton	8.30	a.m.	Sun.	Aug.	31	C.N.R.	Drive to McDonald Hotel. Motor to points of interest.
Lv.	Edmonton	11.30	p.m.	Sun.	Aug.	31	C.N.R.	
Arr.	Jasper	8.30	a.m.	Mon.	Sept.	1		Stay at Jasper Lodge. Golf, riding, etc. Drives.
Lv.	Jasper	8.50	a.m.	Wed.	Sept.	3	C.N.R.	
Arr.	Vancouver	8.00	a.m.	Thurs.	Sept.	4		Drive to steamer.
Lv.	Vancouver	10.30	a.m.	Thurs.	Sept.	4	C.P.SS.	Drive to Empress Hotel.
Arr.	Victoria	2.30	p.m.	Thurs.	Sept.	4		Drive around city, golf, etc.
Lv.	Victoria	1.45	p.m.	Fri.	Sept.	5	C.P.SS.	
Arr.	Vancouver	5.45	p.m.	Fri.	Sept.	5		Drive to Hotel Vancouver. Drive to Stanley Park and city, golf, etc.
Lv.	Vancouver	10.00	a.m.	Sun.	Sept.	7	C.P.R.	
Arr.	Kamloops	8.00	p.m.	Sun.	Sept.	7		Park train overnight.
Lv.	Kamloops	5.00	a.m.	Mon.	Sept.	8	C.P.R.	
Arr.	Golden	2:00	p.m.	Mon.	Sept.	8		Drive to Emerald Lake Chalet.
Lv.	Golden	3.30	p.m.	Mon.	Sept.	8	Motor	
Arr.	Emerald Lake	5.45	p.m.	Mon.	Sept.	8		
Lv.	Emerald Lake	1.00	p.m.	Tues.	Sept.	9	Motor	
Arr.	Lake Louise	4.30	p.m.	Tues.	Sept.	9		Chateau Lake Louise.
Lv.	Lake Louise	3.00	p.m.	Wed.	Sept.	10		
Arr.	Banff	6.00	p.m.	Wed.	Sept.	10		Motor to Banff Springs Hotel, golf, swimming, drives, riding, etc.
Lv.	Banff	6.45	a.m.	Thurs.	Sept.	11	C.P.R.	
Arr.	Regina	10:30	a.m.	Fri.	Sept.	12	C.P.R.	Drive around city. Visit Royal Canadian Mounted Police. Hotel Saskatchewan.
Lv.	Regina	1.30	p.m.	Fri.	Sept.	12	C.P.R.	
Arr.	Ft. William	11.00	a.m.	Sat.	Sept.	13		
Lv.	Ft. William	12:20	p.m.	Sat.	Sept.	13	C.P.SS.	Great Lakes.
Arr.	Sault Ste. Marie	9.00	a.m.	Sun.	Sept.	14	C.P.SS.	(Attend church, if desired).
Lv.	Sault Ste. Marie	1:00	p.m.	Sun.	Sept.	14	C.P.SS.	
Arr.	Pt. McNicholl	8.00	a.m.	Mon.	Sept.	15		
Lv.	Pt. McNicholl	8.15	a.m.	Mon.	Sept.	15	C.P.R.	
Arr.	Toronto	11.45	a.m.	Mon.	Sept.	15		Stay at Royal York Hotel. Sight-seeing drive around Toronto. Visit Exhibition.
Lv.	Toronto	9.00	a.m.	Wed.	Sept.	17	C.P.R.	
Arr.	Ottawa	4.15	p.m.	Wed.	Sept.	17		Walk to Chateau Laurier. Drive around city.
Lv.	Ottawa	3.00	p.m.	Thurs.	Sept.	18	C.P.R.	
Arr.	Montreal	6.00	p.m.	Thurs.	Sept.	18		Drive to Hotel.
Lv.	Montreal	10:00	a.m.	Fri.	Sept.	19	C.P.SS.	

COST OF THE ABOVE TRIP—$535.05

TOUR "D"

(SPECIAL TOUR IN THE MARITIME PROVINCES)

Lv.	Montreal	7.00	p.m.	Fri.	Sept.	5		Dinner in Diner.
Arr.	Fredericton	11.50	a.m.	Sat.	Sept.	6		Breakfast in Diner. Lunch. Dinner.
Lv.	Fredericton	6.10	p.m.	Sat.	Sept.	6		
Arr.	St. John	8.35	p.m.	Sat.	Sept.	6		Transfer to hotel. Room at Admiral Beatty.
				Sun.	Sept.	7		Breakfast at Admiral Beatty. Lunch at Admiral Beatty. Dinner at Admiral Beatty. Room at Admiral Beatty.
				Mon.	Sept.	8		Transfer to wharf.
Lv.	St. John	7.15	a.m.	Mon.	Sept.	8		Breakfast on steamer.
Arr.	Digby	10.30	a.m.	Mon.	Sept.	8		
Lv.	Digby	10.45	a.m.	Mon.	Sept.	8		
Arr.	Annapolis Royal	11.30	a.m.	Mon.	Sept.	8		Automobile trip to Fort Anne Park.
Lv.	Annapolis Royal	12.17	p.m.	Mon.	Sept.	8		Lunch in Diner. Short stop to be made at Grand Pré, to view the Memorial Park.
Arr.	Halifax	5.55	p.m.	Mon.	Sept.	8		Transfer to the Lord Nelson Hotel. Dinner at the Lord Nelson Hotel. Room at the Lord Nelson Hotel.
				Tues.	Sept.	9		Breakfast at the Lord Nelson Hotel. Drive around city. Lunch at the Lord Nelson Hotel. Harbour Excursion; Complimentary. Dinner at the Lord Nelson Hotel. Room at the Lord Nelson Hotel.
				Wed.	Sept.	10		Breakfast. Transfer to station.
Lv.	Halifax	8.00	a.m.	Wed.	Sept.	10		Lunch and dinner in diner.
Arr.	Sydney	7.50	p.m.	Wed.	Sept.	10		Transfer to Isle Royal Hotel. Room and meals at Isle Royal Hotel.
				Thurs.	Sept.	11		Drive around city. Transfer to station.
Lv.	Sydney	7.20	p.m.	Thurs.	Sept.	11		Sleeper to Pictou.
Arr.	New Glasgow	3.40	a.m.	Fri.	Sept.	12		
Lv.	New Glasgow	7.20	a.m.	Fri.	Sept.	12		
Arr.	Pictou	8.15	a.m.	Fri.	Sept.	12		Breakfast in Pictou Lodge.
Lv.	Pictou	9.00	a.m.	Fri.	Sept.	12		
Arr.	Charlottetown	1.00	p.m.	Fri.	Sept.	12		
Lv.	Charlottetown	1.15	p.m.	Fri.	Sept.	12		Transfer to Beach Grove Inn.
Arr.	Beach Grove Inn			Fri.	Sept.	12		Lunch and dinner at Beach Grove Inn.
				Fri.	Sept.	12		Room at Beach Grove Inn.
				Sat.	Sept.	13		Lunch at Beach Grove Inn. Transfer to Charlottetown.
Lv.	Charlottetown	2.00	p.m.	Sat.	Sept.	13	No. 41	Dinner in diner.
Arr.	Moncton	10.15	p.m.	Sat.	Sept.	13	No. 1	Room.
				Sun.	Sept.	14		Breakfast. Lunch. Dinner. Room.
				Mon.	Sept.	15		Breakfast. Lunch. Sleeper to Quebec.
Lv.	Moncton	2.35	p.m.	Mon.	Sept.	15	No. 3	Dinner in diner.
Arr.	Levis	4.00	a.m.	Tues.	Sept.	16	No. 3	
Arr.	Quebec	7.00	a.m.	Tues.				Transfer to Chateau Frontenac. Breakfast at Chateau Frontenac. Lunch at Chateau Frontenac. Transfer to steamer.
Lv.	Quebec			Tues.	Sept.	16		Sail by S.S. "Empress of France."

Features	$104.50
Gratuities	10.50
Rail Fare	56.95
Service Charge	18.05
Total Cost	$190.00

The C.P.R. has advised Dr. Routley, the General Secretary, that their London Office states that the bookings for the various tours to date are as follows: Tour "A", 26; Tour "B", 41; Tour "B-1", 15; Tour "C", 88; Tour "C-1", 4.

There are 104 undecided, and who may wish to be independent after the Convention is over.

EX-OFFICERS OF THE CANADIAN ARMY MEDICAL CORPS

The following circular letter from Dr. Ross Millar, directed to ex-officers of the Canadian Army Medical Corps, is published here for the information of all interested.

"The Honourable J. H. King, Minister of the Department of Pensions and National Health, is desirous of co-operating with the local Committee of the British Medical Association in Winnipeg in order to have, as far as possible, a representation of the ex-Medical Officers at the forthcoming meeting of the Association which is to be held in Winnipeg August 26-29, 1930.

"A complete list of all the Canadian physicians who served in Canada or with the Canadian Expeditionary Force, as well as those seconded to the Royal Army Medical Corps, has been prepared and a similar letter to this is being sent to each ex-officer. The latest address has been obtained from the Canadian Medical Directory, and possibly some errors or deficiencies in these addresses have occurred, so that if you know of any officer who has been unintentionally omitted, please send his name and address to Dr. J. D. Adamson, Secretary, General Committee for B.M.A., Medical Arts Bldg., Winnipeg.

"This Department will have completed a new hospital of 250 beds at Deer Lodge, which is on the street car line within easy distance of the Association meetings and where, if accommodation in the city is limited, it may be possible for ex-officers, and particularly ex-officers who are pensioners, to obtain sleeping accommodation at a moderate cost. Also, if sufficient returns are received from this letter, arrangements will be made for marquees, which will be pitched on the grounds of the hospital on the banks of the Assiniboine River, and it is expected that officers' batmen would be supplied from the Canadian Legion in Winnipeg if so desired. It would be impossible to arrange for any accommodation for officers' wives, at the Departmental hospital, and such matters should be arranged through the General Committee in the city.

"As accommodation will be limited, prospective visitors are requested to indicate by direct communication with Dr. Adamson at Winnipeg what their requirements would be. You are urged to write a personal letter to your medical friends and associates of the Great War throughout the Empire, inviting them to attend the meetings, and setting forth the attractions which Canada will offer at that time.

"On behalf of Dr. Harvey Smith, President-elect, and the General Committee, I am asked to state that a very hearty welcome will be extended to all who are able to attend.

ROSS MILLAR, M.D.,
Director Medical Services,
Dept. of Pensions and National Health."

LEADERS IN BRITISH MEDICINE

SIR E. FARQUHAR BUZZARD, BART., K.C.V.O., M.A., M.D., F.R.C.P.

Winnipeg will delight to honour the Regius Professor of Physic at Oxford, Sir Farquhar Buzzard, the successor in office of Sir Archibald Garrod, and the well-beloved Sir William Osler, who comes as President of the Section of Neurology.

Sir Farquhar was born in London, the son of the late Thomas Buzzard, M.D., F.R.C.P. He was educated at Charterhouse, Magdalen College, Oxford, and St. Thomas's Hospital, where he was Mead Medallist. Scholarship was, however, not his only claim to distinction, for he was a noted footballer, being a member of the Oxford University Association Eleven from 1892 to 1894, the old Carthusian Eleven, the winners of the Amateur Cup in 1894, 1897, and the London Senior Cup, in 1895, 1896, and 1897.

He is now a distinguished consultant on diseases of the nervous system. He is Physician to St. Thomas's Hospital, Honourary Physician to the Radcliffe Infirmary, Oxford, and to the Artists' Benevolent Fund.

Honours and distinctions have come to him in full measure. He was created K.C.V.O. in 1927, and a Baronet in 1929. He is Physician-Extraordinary to His Majesty the King; a Fellow of the Royal Society of Medicine, and Hon. Colonel, R.A.M.C. (T.F.). He was Goulstonian Lecturer in 1906.

Sir Farquhar has contributed extensively to medical literature, and is, moreover, well known for his articles on the nervous system in Allbutt's System of Medicine, and for others in Osler's Modern Medicine. He is married and has two sons and three daughters.

SIR HUMPHRY DAVY ROLLESTON, BT., K.C.B., G.C.V.O.

One of the most charming of the overseas visitors to Winnipeg in August, 1930, will be the President of the Section of Medical Sociology, and History of Medicine, Sir Humphry Rolleston, Regius Professor of Physic at Cambridge, and Physician-in-ordinary to H. M. the King.

As his name implies, he is of the family of

Sir Humphry Davy, his mother being a niece of that distinguished scientist, the inventor of the miner's safety lamp. Educated at Marlborough, Cambridge, and St. Bartholomew's Hospital School, he has gone from honour to honour. He is Vice-president, and Physician Emeritus to St. George's Hospital; Consulting Physician (with the rank of Surgeon-Rear-Admiral) to the Navy, Member of Medical Administrative Committee, Royal Air Force, and Chairman of the Central Joint V.A.D. Council, etc. Until recently he was President of the Royal College of Physicians of London.

He holds honorary degrees from Oxford, Pennsylvania, Durham, Glasgow, Edinburgh, Bristol, Birmingham, Jefferson, Padua, Dublin, and Bordeaux.

As an author, he is known the world over for his works on "Diseases of the Liver," "Old Age," "Clinical Lectures." With his predecessor in the Regius Chair of Physic, the late Sir Clifford Allbutt, he was joint editor of a System of Medicine in eleven volumes, and just lately has published a notable memoir on "The Right Honourable Sir Thomas Clifford Allbutt, K.C.B."

In 1894, he married Lisette Ella, daughter of F. M. Ogilvy. They have one son. Their home, "Southfield," in Cambridge is celebrated for its hospitality, much as was Osler's home when he was at Oxford.

In 1926, he was awarded the Gold Medal of the British Medical Association, "in recognition of his scientific work and of his distinguished services to the profession and to the Association.

Hospital Service Department Notes

THE REDUCTION OF NOISE IN HOSPITALS

BY HARVEY AGNEW, M.D.,

Secretary, Department of Hospital Service, Canadian Medical Association

Toronto

Every advance in civilization seems to create or be accompanied by undesired complications. The introduction of industrial machinery caused a social upheaval and the motor car created new problems in law enforcement. We are very proud of our beautiful, well-constructed new hospitals, which are such a tremendous advance upon their predecessors; yet it is to be regretted that so many of them are proving to be veritable "loud speakers," amplifying every sound and transmitting it to the farthest corner of the building. This annoyance, this *bête noir* of the administrator, is due in large part to the modern fireproof type of construction, wherein the rigid framework of steel, tile, or concrete permits the undiminished transmission of sound. Reflection from the hard fireproof floors and transmission by the greatly increased plumbing now considered essential to hospital efficiency augment this effect. It is the purpose of this article to consider some of the factors involved, and to suggest means of amelioration or eradication of this source of irritation.

The effect of noise on a sleeping individual has been studied by Laird in the sleep laboratory at the Colgate Psychological Laboratory. Although not awakened by the noise of a passing truck, a sleeper may be so disturbed that his systolic blood pressure may rise 20 mm. and special galvanometers show a decided increase in muscular tension. The wearing, exhausting effect on the nervous system of the constant repetition of sound is now scientifically recognized. Were the effects not so indirectly manifest, were the results more easily traceable to their source, there is little doubt but that infinitely greater effort would be made than at present to eliminate preventable noise from our daily life, to turn off the jazz when we are trying to think or talk, to demand noiseless typewriters, and to gain a larger measure of that thought-clarifying silence upon which we insist when sinking a putt, drawing the target-trigger, or loosing the feathered shaft. And if desirable for the well, how essential for the sick that we preserve that "Silence which, like a poultice, comes to heal the blows of sound."

THE BEHAVIOUR OF SOUND

Sound waves travel at the rate of 1100 feet per second. In an enclosed building they almost immediately impinge upon some surface and are then either reflected or absorbed, depending upon the nature of the surface struck. In an empty room, the surfaces of which are composed of hard smooth flooring and plaster, the waves are reflected back and forth so rapidly that a ringing sound or rumble is produced. With this *reverberation* we are all familiar from hearing it in empty houses, tunnels, or empty auditoria. The term *echo*, on the other hand, is applied to a more or less delayed reflection from a single surface which thus retains many recognizable characteristics of the initial sound.

Acoustical engineers have investigated most thoroughly this phenomenon of reverberation, and various building and surfacing materials have been studied and evaluated on the basis of their content of "units of absorption". It is this factor of absorption which eliminates reverberation from furnished rooms and makes it a much easier task to speak or to listen in a fully occupied auditorium than in an empty one. By knowing the degree of absorption of various materials entering into the construction or the furnishing of a room, the amount of absorption of a standard sound in any room can be determined.

SOUND ABSORPTION VALUES

The Coefficient of Sound Absorption, calculated on the basis of sound reflection.

Open window (no reflection and accepted as standard for comparison)	1.0
Heavy velour curtains	.5 – 1.0
Acoustical tiles of fibre, felt or mineral products	.45– .74
Heavy rugs	.30 up
Acoustical plasters	.30
Carpets	.15– .29
Poor absorbents of sound:	
Varnished or waxed hardwood	.03
Linoleum	.03
Ordinary plaster	.025
Concrete	.015
Terrazzo or marble	.01

The *coefficient of absorption* of various substances has been established on a simple basis. A wide open window from which there is naturally no reflection of sound produced from within has perfect absorption, from the viewpoint of reflection back into the room, and hence an open window is said to have a coefficient of 1 (one unit absorption per square foot of surface). Heavy velour curtains hanging in deep folds absorb sounds well, even up to complete absorption, and so have coefficients ranging from 0.50 to 1.0 units per square foot of surface covered. (The degree of absorption of hangings and draperies refers to sound *reflection*, not sound *transmission*.) Carpets have fair absorption, ranging from 0.15 to 0.29 units per square foot. Thick rugs may have still higher values. On the other hand, varnished wood and linoleum are both low in absorption, the coefficient being 0.03. The index for concrete is 0.015 and for terrazzo and marble, 0.01. Ordinary smooth plaster has the low coefficient of 0.025 to 0.034, and in fact, plaster walls and ceilings are said to reflect a higher percentage of sound waves than a mirror does of light!

For the statistically minded it may be interesting to note that acoustical engineers, in working out the absorption of sound in churches and auditoria, estimate that each person in the audience has an absorption value of 4.7 units; each church pew (seat), 0.2 units and, if upholstered, 1.0 to 2.5 units. Balconies offer special problems to auditorium designers. For instance, a low, deep balcony may not provide enough ingress for sounds from the stage. A balcony with a high, flat, or dome ceiling beneath it may develop a pocket reverberation beneath it affecting all auditors sitting under the balcony. The best balcony from an acoustic standpoint has a ceiling beneath it which slopes down slightly from the front to the back.

OVERCOMING NOISE IN HOSPITALS

Architects are now paying more attention to special features designed to minimize sound conduction. *Stair wells* and *elevator shafts* are enclosed and are frequently placed upon a side corridor. Much attention has been paid to the *corridors* themselves. The long open "tunnel," stretching perhaps hundreds of feet from one end of the building to the other, is now broken at frequent intervals by self-closing doors which have proved to be of definite assistance in confining sounds to one unit. One frequently sees cross-beams across the corridor ceiling; this construction feature, which is much more commonly noted in hotels, helps to break sound waves travelling along the ceiling. One well-known architect prefers to have room doors set back from the corridor line (frequently in pairs), so as to break conduction along the side walls. Specially prepared ceilings are frequently used in corridors. Preparations of fibre, perforated metal, and special acoustic plaster are frequently used. These will be discussed later.

The *corridor and room floors* require special consideration. Terrazzo is meeting with increased favour on account of its cleanliness and its durability, but it is undoubtedly more noisy than either battleship linoleum or rubber. True, linoleum absorbs very little sound and reflects most of the sound waves striking it, but it has the advantage that it deadens the sound of footsteps, instead of amplifying them as terrazzo does. Traffic sounds constitute a large proportion of private room sound grievances. Cinder concrete floor fill is quieter than ordinary concrete. One large western hospital used "Aerocrete" as a floor fill. This is made with a specially prepared cement which breaks up the water added in the mixing process into its component gases, thus rendering the concrete spongy and light and, therefore, increasing its sound and heat insulation value.

The maternity wing needs careful consideration. The *caseroom*, and the *nursery* as well, should be sound-isolated, not only from the rest of the hospital but also from the rooms of the maternity patients. Such provision also applies,

although to a lesser extent, to the pædiatric ward. In all wards, the *utility rooms* and the *diet kitchens* should be so guarded by self-closing doors or by location "around the corner" that sound transmission is minimized. This is sometimes difficult, for the tendency to-day is to bring these services as close as possible to the patient in order to conserve the nurses' energy. For a similar reason, the *nurses' station* must be wisely placed. The nurse must be in a position to oversee the entire ward or corridor, but conversation, rattling of charts and other noises which emanate from this room can be reduced by glass enclosures, by care in selecting chart holders and tables, (giving preference to rubber mounts), and by arranging a rest room at some less prominent point wherein special nurses and others may sit when not serving their patients.

Much annoyance is caused by loud buzzers or bells on the *signal system,* by persistent ringing of unnecessarily loud telephones, and by old style "bumpy" steam radiation. A defect frequently noticed in the newer fire-proof hotels in smaller towns and in many hospitals is that plumbing and other sounds from the next room are transmitted through the walls with irritating clarity. Wall insulation costs money but it is well worth the expense. Enough sound may be transmitted from room to room through non-insulated steam or water pipes to nullify completely the effect of expensive ceiling, wall and door treatment. A new plumbing silencer, designed to eliminate "water hammer," has recently been perfected. It is surprising how much sound is transmitted through transoms, ventilators, and even keyholes. Sounds transmitted through ventilators may be reduced by covering the openings into the rooms with a "baffle", lined with good sound absorbing material such as acousti-celotex. All *heavy motors* and other *noisy machinery* subject to vibration should be mounted on insulated foundations.

PARTITIONS

The construction of *partitions* calls for some care. Few modern buildings show a real scientific effort to soundproof walls. Various substances, such as eelgrass, cork, and felt have been used with varying results. It is easier to achieve heat insulation than sound insulation. Powdered gypsum is one of the best fillers and has the advantage of being strongly fire-resisting, a feature due in part to the contained water of crystallization. A two-inch air space, if unbridged or unfilled, has been found quite satisfactory and, according to Professor Sabine, is equivalent in insulating power to a 6¾ inch solid brick wall. A four-inch air space has the insulation value of 10½ inches of solid masonry. "It appears that the problem of sound insulation in buildings is not a matter of damping acoustic waves in a medium, but of preventing the transfer of vibrations from one solid material to another." Ordinary walls transmit vibrations because of the connection between the surfaces. *The intervening space must not be bridged by anything rigid.* One writer emphasizes that even one nail driven through from side to side will set the other surface in vibration, as does the pin under the bridge of a violin.

CEILING AND WALL SURFACES

The treatment of the *ceiling* depends upon whether the building is an old one or is under construction. In new buildings transmission can be reduced by the use of specially "hung" ceilings, suspended from special hangers, the metal continuity of which is broken by felt pads. The moderate extra cost is more than compensated by the greater insulation obtained. This hung ceiling and the ceiling in old buildings may be coated with acoustical plaster or with one of the sound-absorbing materials now on the market, thus decreasing both the transmission and the reflection of sound.

Acoustical plasters are fairly rough and highly porous, being made of pumice particles bound with cement or gypsum. The absorption value is about 30 per cent. One of the best of these is "Dekoosto", a Canadian product composed of pumice, gypsum and a gas-forming chemical which fills the plaster with bubbles before it sets. (Fig. 1). Others are "Sabinite", also composed of pumice and gypsum, and "Akoustolith," in which the pumice is bound with cement. Ground coral was used with success in one recently constructed hospital in Ontario. Acoustical plaster must be carefully applied by experienced plasterers, as the pores on the surface are apt to be clogged if water is expressed by too much pressure in surfacing. It can be thoroughly cleaned and renewed only by brushing and spraying with acoustical paint, and this brushing may dislodge small flakes. Therefore, it is more popular for corridors and kitchens than for, say, caserooms.

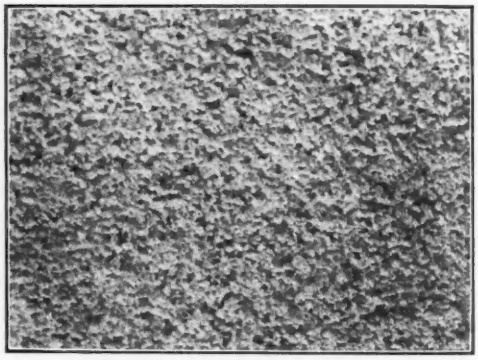


FIG. 1.—"DEKOOSTO" PLASTER
Composed of pumice, gypsum and a gas-forming ingredient which makes the plaster porous. Sound absorption value is approximately 30 per cent.

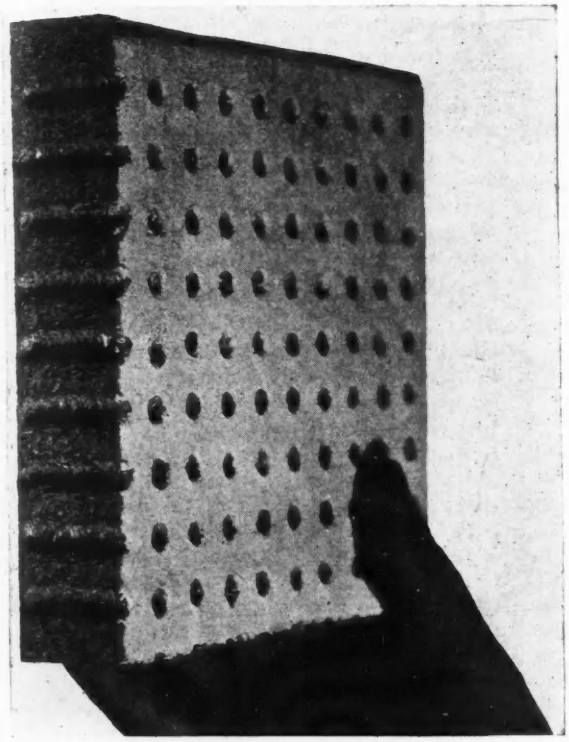


FIG. 2.—"ACOUSTI-CELOTEX"

A fibre tile made of compressed sugar cane. Sound waves enter holes and are broken up. Popular for ceilings of nurseries and corridors. Sound absorption value is from 47 to 70 per cent depending upon the tile thickness.

The organic acoustical products are made of *fibre*, *felt*, and other organic material. One of the best of these, "*Acousti-Celotex,*" is widely used in hospitals and broadcasting stations and comes as a perforated fibre tile made of compressed sugar cane. (Fig. 2). In the 1¼ inch thickness, the coefficient of absorption is 70 per cent; the ¾ inch thickness has a value of 47 per cent. (Thinner sheets of this product are used under linoleum and carpet.) Another is "Nashkote A," a hair and asbestos felt covered with muslin, with a one-inch felt; this has a coefficient of 45 per cent. "Nashkote B," which is covered with white oilcloth with pinhole perforations, has a coefficient of 64 per cent. As the method of determining coefficients varies in different laboratories, these percentages must be regarded as representing approximate relative values only. Other materials used in making these coverings are wood fibre, asbestos, and flax. Porous products, especially when organic, might be considered as likely breeding places for vermin. However, Neergaard comments upon this possibility in his studies and finds no report of such occurrence where modern methods of sound deadening have been used.

Another product is "J-M Sanacoustic Tile" which comes as a tile-shaped pan of metal containing a sound-absorbing pad of rock wool which has been substituted for the asbestos-goat-hair felt formerly used. (Fig. 3). The surface of these tiles is finished in baked enamel and is covered with small perforations. This is said to have an absorption value of 74 per cent (Sabine).

The maintenance and cleaning of these absorbent products must be considered. Rough plasters do harbour dust, but vacuum-brushing and spray-painting with special paint will renew the surface and, moreover, it is doubtful if there is much danger of cross-infection by this means. If there is any likelihood of the deeper recesses, either of the plaster or the other products, proving a source of cross-infection, rooms with ceilings of this material can be sealed and subjected to fume disinfection. Acoustic-celotex has a soft fibrous surface which cannot be washed, but which, F. R. Watson has demonstrated, can be painted without diminution of absorbent power, provided the holes are not filled. If soaked with water, it dries slowly with some danger of loosening. Nashkote B is more readily washed, having an oilcloth surface; it retains water longer when soaked, which may affect the cement binding it to the ceiling. Its replacement cost is low. Sanacoustic tile washes readily, is fireproof, and seems generally satisfactory.

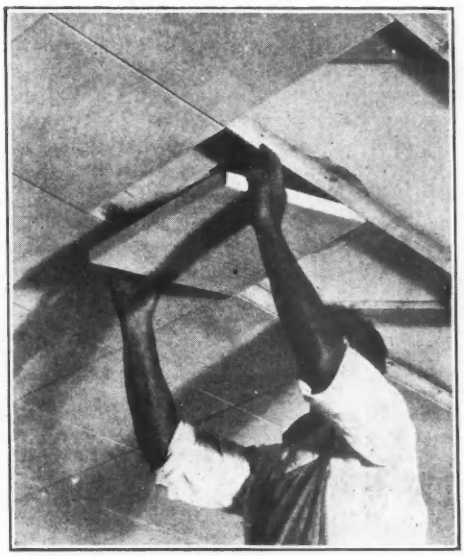


FIG. 3.—"SANACOUSTIC" TILE

A flat enamelled metal pan, finely perforated and filled with a sound absorbent rock wool material. The tiles clip into place on special metal supports. The absorption value is stated to be 74 per cent.

Its appearance may not be quite as pleasing as that of some other preparations when new.

Private Rooms

While acoustical experts are directing most of their attention to general construction, noisy equipment, nurseries, and corridors, the *private room* itself is not being forgotten. Thick rugs help to overcome the noise amplified by terrazzo or hardwood floors; doors should be provided with door checks, or, if economy must be practised, at least with rubber bumpers, friction hinges, or rubber door knob guards. Door hooks are rapidly replacing the knob, so inconvenient to the scrubbed nurse or doctor, and the clicking latch is also fast disappearing. Sound-absorbing material may be used for the portable or other screens. Chairs and tables, not equipped with rubber tired casters, should have rubber shoes. If metal furniture be used, pieces should be selected in which the drawers do not bind. Rubber vases do not click on glass dresser tops, and composition trays make but little noise. Leather-upholstered chairs have practically no absorption value, but more absorbent coverings, cushions, and heavy draperies cannot be used here as they might be utilized in a private home. The rimming of lids of dressing jars with adhesive tape will eliminate one common source of ward noise.

To reduce the entry of street noises into hospitals situated on traffic arteries, experiments are now being conducted with reflectors placed outside of the window, on the window ledge, in a somewhat similar fashion to the draught reflectors frequently placed inside of the window. These are designed to reflect back and up sounds arising from the street below. Baffle boards faced with sound-absorbing material have been placed vertically four inches within the window, thus permitting ventilation and marked sound reduction, provided the window is not raised above the level of the baffle board.

Hospital Personnel and Other Factors

Not all unnecessary sound production in a hospital can be attributed to the operation of its equipment. Anyone who has required hospital care knows that one of the most aggravating features from the viewpoint of the patient is the loud conversation, often accompanied with laughter, on the part of nurses and doctors. Laughter, especially, bothers many patients who cannot understand why anyone can be light-hearted and gay while *they* are sick. We, ourselves, are responsible for a great deal of this aggravation. The banging of a single door may awaken a dozen patients. The clatter of falling dishes, the flapping of blinds, the squeaking of stretchers, or the impact of hard heels assail the ears with endless repetition during the day and night.

Much can be accomplished by seeking the cooperation of tradesmen and others. Not only should notices be posted at the goods and ambulance entrances, but letters might be sent to firms ordinarily supplying the hospital, especially the coal dealers, to ambulance and taxi companies, to contractors on neighbouring new structures, to the fire department, and to the principals of neighbouring schools.

One most annoying feature, especially at night, is the warming up of doctors' and visitors' cars, or the clashing of gears, in the parking space which is so often right under the hospital windows. Not only are the ears thus assailed, but the nostrils are offended by the clouds of noxious fumes that are borne in through the open windows. In choosing a site, or in landscaping the grounds, the location of the parking space for doctors' and visitors' cars must be given much more careful consideration than in the past. Incidentally, a large Canadian hospital, which is seeking a new site, is considering the need of locating near an airport, realizing that this is the probable route whereby out-of-town patients will be transported in the future. This will introduce another noise factor without doubt and already complaints of this nature have been reported in other countries.

The following lines* from the pen of the Rev. Dr. Alexander Louis Fraser of Bathurst, N.B., depict an experience all too familiar to every practitioner of medicine. The physician to whom the practice of medicine is more than a livelihood or a scientific experiment, whose solicitude for his patient is his first thought, will understand and appreciate this sonnet:

In a Hospital

Soft-sandalled Death and I this very night
Were at close range; 'twas where a woman lay,
Young, mother of a boy, for just one day!
I saw at once 'twas but a losing fight.
Exhausted skill stood speechless at the sight,
While Hope and Fear alike were in suspense;
A soul was knocking at the door of sense,
Which viewlessly, at length, took its long flight.

How strange the world seemed then; its gold but dross;
A bursting bubble, Fame, when Death is nigh.
I sought the city square; the soul just gone,
Which left us far behind, found gain, not loss,
In its affinities beyond the sky—
A cock then gave its usual cry for dawn.

* People of the Street and Other Poems, by Alexander Louis Fraser. The Globe Press, Limited.

Provincial Association Notes

ONTARIO MEDICAL ASSOCIATION—JUBILEE MEETING

As previously announced, the Jubilee Meeting of the Ontario Medical Association will take place in the Royal York Hotel, Toronto, on May 27th, 28th, 29th and 30th next. The Committee in charge is endeavouring to make this meeting one of the outstanding events in the history of the Association, from the standpoint of both program and entertainment. Interesting announcements will appear in each issue of the *Journal*, from now until the time of meeting.

The following is a copy of the program, as arranged to date:—

PROGRAM

Tuesday, May 27th

10.00 a.m.—Meeting of the Board of Directors of the Ontario Medical Association.

2.30 p.m.—Meeting of the Committee on General Purposes of the Ontario Medical Association.

7.00 p.m.—Round Table Dinner—Program in charge of the Committee on Inter-Relations.

Wednesday, May 28th

GENERAL SESSION

Chairman—George S. Young;
Secretary—Gordon S. Foulds.

9.30 a.m.—
The general practitioner and preventive pædiatrics.
Alan Brown, Toronto.
Heart disease in middle life.
A. J. Mackenzie, Toronto.
After-dinner complaints.
George C. Hale, London.
The heart in diphtheria.
H. B. Cushing, Montreal.
Coronary artery disease.
Oskar Klotz, Toronto.
The ophthalmologist in consultation.
F. T. Tooke, Montreal.

12.30 p.m.—Luncheon.
Address:—Doctors and alleged doctors.
Mr. Hector Charlesworth, Toronto.

2.30 p.m.—
Surgical problems presented by the diabetic.
Alfred T. Bazin, Montreal.
The clinical value of liver function tests.
G. M. Piersol, Philadelphia.
Causation of disease.
W. A. Lincoln, Calgary.
The enlargement of the thymus gland.
A. Stanley Kirkland, Saint John.
Indigestion.
Campbell Laidlaw, Ottawa.

7.00 p.m.—Annual Dinner Dance, Royal York Hotel.

Thursday, May 29th

9.30 a.m.—
Indications and contra-indications for spinal anæsthesia.
John Parry, Hamilton.
Acute and chronic inflammation of the maxillary antrum.
Perry G. Goldsmith, Toronto.
Post-operative nausea.
W. B. Burnett, Vancouver.
Title to be announced
H. K. MacDonald, Halifax.
Diagnostic points in gynæcology.
B. P. Watson, New York.
The rôle of birth traumatism in urinary infection.
F. S. Patch, Montreal

12.30 p.m.—Luncheon.
Address:—The ideals of medical practice.
Rev. Father John E. Burke, C.S.P.

2.30 p.m.—
Prognosis in diseases of the circulation.
J. C. Meakins, Montreal.
Disability following fractures about the ankle.
W. E. Gallie, Toronto.
Sterility.
A. H. Aldridge, New York.
Demonstration of obstetrical procedures, by motion pictures, prepared by
J. B. DeLee, Chicago.

Friday, May 30th

9.30 a.m.—
Ramisection in megalocolon.
D. E. Robertson, Toronto.
The value of clinical evidence.
I. J. Yeo, Charlottetown.
Serum therapy and immunization.
Beverley Hannah, Toronto.
Pernicious anæmia.
T. W. Walker, Saskatoon.
Diagnosis and treatment of sub-dural hæmatoma.
Kenneth G. McKenzie, Toronto.
General principles underlying the treatment of fractures.
George E. Wilson, Toronto.

SECTION OF SURGERY

Chairman—Roscoe R. Graham;
Secretary—R. V. B. Shier.

Wednesday, May 28th

9.30 a.m.—

Early symptoms of carcinoma.
T. A. J. Duff, Toronto.

Surgical emergencies in general practice, with case reports.
W. A. Lewis, Barrie.

Incontinence of urine due to aberrant ureters.
J. C. McClelland, Toronto.

Significance of limps in childhood.
George A. Ramsay, London.

Experience in acute appendicitis.
H. M. Yelland, Peterborough.

The surgical risk to the thyro-toxic patient.
J. K. McGregor, Hamilton.

SECTION OF PÆDIATRICS

Chairman—George R. Pirie;
Secretary—Lawrence M. Murray.

Wednesday, May 28th

2.30 p.m.—

Special methods of infant feeding and their applications.
Alton Goldbloom, Montreal.

Ottawa's experience with infantile paralysis.
George A. Campbell, Ottawa.

Pathology of infantile paralysis.
I. H. Erb, Toronto.

Hæmorrhagic disease of newborn as etiological factor in intracranial hæmorrhage.
R. R. MacGregor, Kingston.

Vitamin value of foods.
F. F. Tisdall, Toronto.

SECTION OF OPHTHALMOLOGY

Chairman—R. Sterling Pentecost;
Secretary—Alexander E. MacDonald.

Wednesday, May 28th

2.30 p.m.—

Industrial ophthalmic accidents.
F. R. Bennetto, Hamilton.

Practical ophthalmic procedures.
Sanford Gifford, Chicago.

Symposium, with lantern slides—

Thirty-five cases of melanotic sarcoma, diagnosis, treatment, complications and results.
W. H. Lowry, Colin Campbell, C. E. Hill, Alexander E. MacDonald, D. N. MacLennan, L. J. Sebert, F. C. Trebilcock, and W. W. Wright, Toronto.

A case of Mikulicz's disease.
F. C. Trebilcock, Toronto.

SECTION OF MEDICINE

Chairman—J. H. Elliott;
Secretary—Wm. Magner.

Thursday, May 29th

9.30 a.m.—

Functional basis of the more common gastric symptoms.
Malcolm Wilson, Toronto.

Epilepsy.
George F. Boyer, Toronto.
W. Wray Barraclough, Toronto.

The venous drainage of the cerebral hemisphere and its relation to disease.
E. A. Linell, Toronto.

Chronic non-tuberculous pulmonary disease.
A. H. W. Caulfeild, Toronto.

Silicosis.
T. H. Belt, Toronto.

Prevention of the recurrence of psoriasis.
Omar Wilson, Ottawa.

EAR, NOSE AND THROAT SECTION

Chairman—R. Sterling Pentecost;
Secretary—Alexander E. MacDonald.

Thursday, May 29th

2.30 p.m.—

Malignant disease of the larynx.
J. E. MacKenty, New York.

Some points regarding the diagnosis of acoustic nerve tumours.
H. A. Skinner, London.

Suppurative otitis media.
John Page, New York.

SECTION OF OBSTETRICS AND GYNÆCOLOGY

Chairman—R. W. Wesley;
Secretary—Frank J. O'Leary.

Friday, May 30th

9.30 a.m.—

Surgical procedures in labour.
Norman M. Guiou, Ottawa.

Cardiac complications in pregnancy.
Leonard M. Murray, Toronto.

Pulmonary complications in pregnancy.
Frank H. Pratten, London.

Discussion on both papers opened by—
B. P. Watson, New Nork.

Placenta prævia, the diagnosis and treatment.
John R. Fraser, Montreal.

Endocrine therapy in gynæcology.
Donald M. Low, Toronto.

SECTION OF UROLOGY

Chairman—Robin Pearse;
Secretary—Charles Crompton.

Friday, May 30th

9.30 a.m.—

Observations on the renal excretion of phenolsulphonephthalein.
Colin A. Chisholm, Toronto.

Prostatic enlargement.
Wm. Hutchinson, Ottawa.

Muscular hypertrophy of the neck of the bladder; case reports.
Oscar Mercier, Montreal.

Excision of prostatic bar by Colling's electrotome; case reports.
A. I. Willinsky, Toronto.

The diagnosis of renal tumours.
E. D. Busby, London.

Medical Societies

THE EDMONTON ACADEMY OF MEDICINE

At the December meeting of the Academy of Medicine, which took the form of the annual dinner, the following officers were elected for the year 1930: *President,* Dr. R. G. Douglas; *First Vice-president,* Dr. B. R. Mooney; *Second Vice-president,* Dr. J. G. Young; *Treasurer,* Dr. Allan Day; *Secretary,* Dr. Harold Orr. *Executive Committee,* Drs. Fulton Gillespie; W. A. Atkinson; H. K. Groff.

A well attended meeting of the Edmonton Academy of Medicine was held on Wednesday evening, February 5th, at the Medical Building of the University.

In continuation of the series of short papers on the history of medicine, Dr. J. S. Wright gave a paper on "Primitive medicine," in which he humourously and eloquently described the very early Egyptian and Babylonian practice of medicine and surgery.

Following this as a preliminary the paper of the evening was given by Dr. C. P. Fitzpatrick, Superintendent of the Mental Institute at Oliver, Edmonton District, on the subject of "General paralysis of the insane." The history, etiology, symptoms, and diagnosis of the disease were very completely covered by the speaker, who completed his masterly discussion of the subject by relating the results of recent treatment of the disease by malarial inoculation, which, in the Province of Alberta has been given a thorough trial in some 125 or more patients. Of the number treated up to date, 34 per cent have been discharged apparently cured; 27 per cent improved; 12 per cent unimproved; 18 per cent died of general paralysis during treatment; and 6 to 7 per cent died of malaria. Inasmuch as practically all cases were certain to die in from one to three years under any previously known treatment, the results achieved to date, nothwithstanding that 6 to 7 per cent succumbed, while 61 per cent were either improved or cured, indicate clearly that the malarial treatment of the disease should be given in all definitely diagnosed cases.

A most interesting discussion of the paper by a number of the members present followed, Dr. Fitzpatrick being highly complimented on his very efficient treatment of the subject.

T. H. WHITELAW

THE CALGARY MEDICAL SOCIETY

The annual banquet of the Calgary Medical society was held on the evening of February 4th at the Palliser Hotel. The chairman of the evening was Dr. W. S. Quint, President of the Society. Out-of-town guests included His Honour the Lieutenant-Governor, Dr. William Egbert; Dr. R. Thompson, representing the Edmonton Academy of Medicine; Dr. J. E. Lovering, of Lethbridge; Dr. R. McCharles, of Medicine Hat; and Dr. A. Wannup, of Red Deer.

In proposing the toast of the medical profession, Mr. Harry Nolan, M.C., M.A. (Oxon.), LL.B., urged co-operation between the legal and the medical professions, and dealt with the various aspects linking the two, namely personal services by the medical man and legal testimony by them in the witness box. He remarked that medical testimony is of greater value to-day than it has ever been. He spoke of the part played by Canadian physicians during the war, especially by the battalion medical officers, and believed that they were a powerful element in maintaining the morale of the men.

Dr. J. S. McEachern, in responding to this toast gave a brief outline of medical history and progress during certain periods from Biblical times to the present. He emphasized the vast changes which have occurred during the past fifty years in the golden age of medicine.

The toast of the guests was responded to by His Honour Dr. William Egbert who practised in Calgary for over twenty years prior to his

appointment as Lieutenant-Governor of the Province. He urged members of the medical profession to take part in public affairs especially of the community in which they lived. He was of the opinion that medical progress had been greater during the past twenty-nine years than in the whole of the last century. During this latter period medical men took a very active part in community affairs and kept in close touch with the community. Nowadays, he said, medical men were devoting practically all their time to their profession and were thus losing hold.

G. E. LEARMONTH

University Notes

The University of Montreal

After passing through the tests of the clinical lesson and the written thesis at the University of Montreal, before a special jury, nine French-Canadian physicians qualified as associate professors of the faculty of medicine. They are Dr. Antonio Bellerose, as professor of clinical surgery; Dr. Léon Gérin-Lajoie, as professor of gynæcology; Dr. Gaston Lapierre, as professor of clinical physiciatrics; Dr. Oscar Mercier, as professor of neurology; Dr. Edmond Dubé, as professor of clinical surgery for children; Dr. Romeo Pepin, as professor of clinical medicine; Dr. Léon-Charles Simard as professor of pathology; Dr. J. A. Vidal, as professor of phthiso-therapy.

According to a statement of Mgr. Vincent Piette, Rector of the University of Montreal, the administrators of the institution would award contracts for work costing approximately $5,000,000, when the tenders were opened on February 25th. As soon as the contracts are awarded the work will be started immediately.

The Rector said the administrators of the Montreal Institute of Radium will open tenders for the construction of a temporary building for the institute, to be included later in the general plans of the new university. The contracts to be awarded for this new building will amount to some $350,000, though the first contract only relates to the foundations.

Mgr. Piette explained that the action is rendered necessary by the fact that the Institute of Radium must evacute its present location in Maisonneuve, the building having been bought by the Federal Government to be transformed into a post office for the east end. It is expected that the institute will be able to occupy its new building in October next. As soon as the new university buildings have been constructed, the rector added, the institute will be included in the new polyclinic hospital to be conducted concurrently with the Faculty of Medicine, and the other building will become the residence for the hospital nurses.

McGill University

The appointment of Dr. John R. Fraser as chairman of the department of gynæcology and obstetrics in the medical faculty at McGill University was given the unanimous approval of members of the Royal Victoria and General Hospitals, at a meeting held on February 17th.

Dr. Fraser, appointed chairman of this department at a recent meeting of the McGill Board of Governors becomes through the approval of the appointment by the joint committee of the two hospitals obstetrician and gynæcologist-in-chief at the Royal Victoria Maternity Hospital, subject to the ratification of the board of governors of the hospital.

The new appointee succeeds to a post held for many years by one of the most outstanding gynæcologists on the continent, Dr. W. W. Chipman, who recently retired from the chairmanship of the department of obstetrics and gynæcology at McGill, which retirement also left vacant the corresponding position in the Royal Victoria Hospital.

Dr. Fraser is a graduate of McGill University, receiving the degree of M.D., C.M., in 1910. Upon graduation he became an interne in the Royal Victoria and worked in this capacity until 1916, when he successively served in the departments of pathology, medicine, surgery and gynæcology.

His first teaching appointment came in 1912 when he was made an instructor at McGill in pathology and bacteriology, later being given a demonstratorship in obstetrics and gynæcology. He was appointed lecturer in this department in 1924 and clinical professor in 1928. Full professorship in the department was granted him by the Governors of McGill towards the close of last year.

The University of Toronto

Dr. F. G. Banting has recently been accorded the great honour of being made Foreign Correspondent to the Royal Academy of Medicine of Belgium, Brussels.

The Faculty of Medicine of the University of Toronto was represented at the Annual Congress of the Council on Medical Education and

Federation of State Medical Boards of the American Medical Association at Chicago, February 17th, 18th and 19th, by Dr. R. D. Rudolf and Dr. E. Stanley Ryerson.

Dr. Ryerson has been invited by the Congress to give a paper on "Medical Registration in Canada."

E. STANLEY RYERSON

The University of Alberta

The total enrolment at the University of Alberta for 1929 was 1,501 and that for 1930 will exceed this number. Of the total there are 172 students in medicine; 1st year 27, 2nd year 43, 3rd year 22, 4th year 30, 5th year 31, and 6th year 19.

T. H. WHITELAW

Topics of Current Interest

The Causes of Baldness

The problem of common baldness is still more or less unsolved, and in its treatment we have made scarcely any progress of importance since Unna attributed the condition to infection by the organisms of seborrhœa. This explanation is evidently not the whole story; protracted and conscientious application of sulphur, which remains our most potent remedy for seborrhœa, is rarely successful in promoting a cure, although it is of undoubted value if begun early in life when excess of scurf is first noticed. In a recent post-graduate lecture* in Vienna, R. O. Stein pointed out that seborrhœa is common in African natives, and yet the bald man is seldom seen among them. Clearly there are other factors at work besides infection, and no one can fail to be struck by the close association of the state of the hair and the state of endocrine metabolism. In his first Lettsomian lecture last year Dr. H. W. Barber† said that "virility tends to loss of hair on the scalp with its increased luxuriance on the beard and body; feminism to a converse distribution." Sabouraud states that eunuchs are seldom if ever affected by the male type of baldness, and women, of course, show a similar immunity, which can be disturbed by endocrine disease. Dr. Barber mentioned a case in which a woman with a suprarenal tumour grew a beard and moustache, and went bald like a man. When the tumour was removed the hair on the face fell off, and the scalp regained its covering, but the signs of virility again returned with recurrence of the tumour. It is, perhaps, something of an anti-climax to recall that popular belief attributes baldness to the wearing of a tight hat —a view which is shared to some extent by dermatologists. W. A. Pusey has lately remarked that "in the common occurrence of baldness we have a manifestation of a transitional stage in man's evolution. . . . Man now uses a hat instead of relying upon a shock of hair as his ancestors did. . . . This does not mean that we can save our hair by discarding our hats. We are a result of our ancestors, and to save our hair we should have to discard the hats of all our ancestors for scores of generations back." There is a certain amount to be said for this "vestigial" etiology of baldness, but it has to reckon with a persistence of the axillary and pubic hair, which has survived in spite of all our clothing. Every theory yet devised has its weak spots, and at present it looks as though alopecia presenilis would long continue to embarrass the profession and enrich the advertising quack.—*The Lancet* **1**: 36, Jan. 4, 1930.

* *Wien klin. Woch.*, p. 1510, Nov. 21, 1929.

† *The Lancet* **2**: 369, 1929.

Heart Disease in Early Life

Heart disease continues to increase in importance as a cause of death. Figures recently compiled by the Public Health Service* indicate that last year, in a group of states with approximately 25,000,000 population, the death rate from heart disease was 228 per hundred thousand. This is compared with rate of 106 from kidney disease, 105 from cancer and 100 from pneumonia. To this high rate various factors contribute, among them the conservation of life in the early age groups and the changing age composition of the population. Yet such explanations do not explain completely, especially when Dr. Clark emphasizes that "heart disease is particularly a disease of early life." About 75 per cent of all cases of heart disease, he asserts, develop in children under 10 years of age. Rheumatic infections are of the first importance in producing heart lesions in this age group. Unfortunately, a well planned preventive campaign must await more satisfactory knowledge of the etiology of rheumatism. On the basis of available knowledge it can be asserted that "growing pains" should no longer be taken lightly, and that in all children adenoids, tonsils and teeth should be kept under close supervision. Add to these precautions the best of care in convalescence after diseases of childhood, and there is little

* Taliaferro Clark, Heart disease a public health problem, Pub. Health Rep. **44**: 2463, Oct. 11, 1929.

more that the family physician can do to prevent the onset of heart disease. The school nurse can extend the protecting arm of preventive medicine a further stage by her supervision in the schools and her follow-up work in the homes, both in bringing patients to the physician and in seeing that his instructions are obeyed.—*J. Am. M. Ass.* **93**: 1975, Dec. 21, 1929.

Surgical Catgut

The preparation of surgical catgut involves the production of material which is free from bacterial contamination, and yet remains flexible, strong, and absorbable. Lord Lister, who introduced sterlized catgut into surgical use, spent forty years in attempting to improve its manufacture, and the Medical Research Council, in a preface to a green book* published to-day, state that the work recorded therein stands in historical succession to his classical studies. They draw attention to the dilemma by which the catgut maker is confronted. Catgut can be efficiently sterilized, but every method of disinfection has some effect in diminishing the tensile strength of the ligature, upon which its surgical value and the safety of the patient depends. The efforts of Prof. Bulloch and his colleagues have been directed to ascertaining the methods by which bacteriological sterility can be achieved with least damage to the physical qualities of the material. Their investigations have had among valuable positive results at least one negative finding of importance—the discredit of biniodide of mercury as a suitable sterilizing agent. The general conclusions reached are summarized as follows:—

1. It has been shown that the pH of the collagen ribbon wash liquid is an important factor in the production of ligatures. To prevent degradation a wash liquid of pH 4.7 is required, but for optimum strength pH 8-9. A compromise may be effected by carrying through most of the process of washing in a solution of pH 4.7 and finishing with a bath of alkali at pH 8-9. For this same reason the ribbons should not be washed in water before spinning.

2. Optimum strength of ligature is obtained by using narrow ribbons and spinning each individually and then collectively, so that each ribbon makes 2.5 turns per inch and then collectively a further 5 turns per inch. It is important that the spinning should be uniform otherwise the strength and diameter along its length will vary.

3. It has been shown that when ligature is treated with iodine an acid is produced which is harmful for the reason given in (1). Means of reducing or eliminating this effect have been worked out by the use of potassium iodate.

4. It has been demonstrated that the treatment of ligature for 8-9 days in such a way that it absorbs 12 per cent of its weight of iodine ensures sterility.

5. The disadvantages of excessive treatment with iodine have been demonstrated and the advantages of removing the iodine from the ligature after sterilizing indicated.

6. Data have been obtained whereby control of the amount of the absorbed iodine may be obtained.

7. The advantages of incorporating glycerol in the iodine solution and in the final alcohol solution have been illustrated, particularly from the point of view of flexibility of the ligature, and therefore strength of the knot.

8. It has been shown that the ligature in aqueous iodine swells. This may be reduced by treating it under tension, when its tensile strength is increased.

Important practical issues are raised by this report. Deaths from tetanus and other infections are known to have resulted from the use of contaminated ligatures, and though fatal results attributed to the use of imperfect catgut are numerically very rare indeed in relation to the vast total number of ligatures used in surgical operations, it is nevertheless recorded that some infection was found in every one of eight batches of catgut ligatures purchased in 1927. The data given in this report and the experience gained in obtaining them have already been useful in the guidance of administrative action. The licensing authority under the Therapeutic Substances Act has decided to add surgical catgut to the list of substances. —*The Lancet* **2**: 946, Nov. 2, 1929.

* The Preparation of Catgut for Surgical Use. By W. Bulloch, L. H. Lampitt, and J. H. Bushill. Medical Research Council, Special Report Series No. 138. H.M. Stationery Office. 1929. Pp. 178. 4s.

The Cost of Medical Care

The interest of the public in the cost of medical care, apparently for many years dormant, seems now to be the topic of the hour. True, one may visit innumerable villages, cities and hamlets of the Middle West, the South, and even the New England states and find both the physicians and the general public little concerned in the current agitation; but in other communities it arouses burning argument and intense feeling. Much of this emotionalism is, of course, the result of propaganda and of personal issues which have little or nothing to do with the purely economic aspects of the question. Nevertheless, the work of the Committee on the Cost of Medical Care and the numerous investigations now being carried on under various auspices in new methods of medical practice make the situation one which the medical profession must consider. As has been said previously in these columns, regardless of the nature of medical practice in the future, physicians will have to do the practising; and the success or failure of any experiment will depend on the extent to which physicians deliver what the public has been accustomed to expect from them in the way of prevention and cure of disease.

The most recent publication of the Committee on the Cost of Medical Care concerns hospital service for patients of moderate means. Mr. Carpenter introduces his consideration with a realization of the fact that hospitals were first constructed for the poor and then provided rooms for the rich, and that only recently have institutions begun to adapt both structure and administration to the care of the middle class. The survey revealed that 121 hospitals out of 132 whose letters tell of future plans include the provision of special facilities for patients of moderate means.

One of the greatest difficulties in adaptation of the present hospital construction and management to the problem of the middle class is the fact that various classes of service are provided under one roof, much as occurs on board ship. Here enter in all the problems of pride, comparisons in food and dishes and linens and decoration, and all those other psychological and esthetic factors on which scientists and economists are likely to lay little stress but which play such a large part in human life. Already buildings are being developed wholly devoted to one type of hospital service.

Hospital rooms with service can now be had at prices varying from six dollars a day to as much as the patient cares to pay, these rates being after all about the same as for the hotels; and the latter do not provide food. Nevertheless, a person who selects a middle class or low middle class hotel when he travels is likely to want the best of hospital accommodations when he is sick. Ward beds and semiprivate beds in rooms for two or four may be had for much smaller charges than single private rooms. However, associated with the charge for the room are such charges as laboratory, anæsthetic, roentgen-ray, special nursing and operating room fees, for which the patient is usually not prepared and which serve not infrequently to bring his total bill to a sum that arouses consternation. Suggestions have been made for elimination or redistribution of such fees, charging them to the room charge or to the flat-rate operation or obstetric fee; but the whole matter of administration is still in an experimental stage.

It is argued that the patient may be able to pay the hospital and special fees and not be able to pay the physician, and vice versa. Of the former state of affairs, physicians are unfortunately too fully cognizant. Hospitals, nurses, ambulances and all the other services are likely to collect before the physician renders and secures payment for his bill. Some institutions are planning to submit one bill covering all fees, and others to establish maximum charges for certain types of medical, surgical or obstetric care. Here are experiments which will be full of grief and grievances before their answers can be known.

Mr. Niles Carpenter, who submits this report for the Committee on the Cost of Medical Care, in his concluding paragraphs arrives at a question which physicians, through their experience, have been asking for several years. "Would the patient of moderate means be able to pay for his hospital care even if the entire hospital world should adopt every one of the new policies outlined in this study?" The advances of modern medicine are amazing and costly. The problems of medical care cannot be separated from all the other economic situations of modern civilization. It is true that far more patients are going to hospitals for medical care than actually require hospitalization from the medical point of view; but the home has disappeared and the helpmate who used to nurse the sick is now a clerk, a secretary or an advertising copy writer, whose income must not be disturbed. The only possible place for the care of the ailing member of the family is the hospital. If the hospital is too expensive, somebody will have to wait for his money; and it requires no Ph.D. to guess who that somebody is going to be.—Editorial, *J. Am. M. Ass.* **94**: 106, Jan. 11, 1930.

Waiting at Out-Patient Departments

One of the subjects discussed at the Recent Baby Week Conference was the distress caused to mothers and their families by prolonged waiting at out-patient departments. The reality and urgency of the problem was admitted by every speaker, including the chairman, Sir Arthur Stanley, who referred to the tenfold increase in out-patient attendance since the premises at St. Thomas's Hospital were erected Dr. Maitland-Jones, who deplored having to attend to irritated mothers and restless children, set out the system adopted at the children's department of his hospital, whereby old patients attend in batches at 9, 10, 11, and 12 o'clock respectively, whilst he emphasized the difficulty of arranging to see new cases by appointment and the fact that in teaching hospitals the new cases are used for instruction in methods of diagnosis, failing which the education of the medical practitioners of the future must suffer. To imitate American methods would, he said, entail great expense, the keeping open of out-patient departments throughout the day, larger premises, and an increase in the medical and administrative staffs. Mr. Leaney thought we had much to learn from other countries in this matter. His own view was that out-patient departments should be consultative only, that a social service depart-

ment should relieve the doctors of clerical work, that new patients should be seen at half-hourly intervals on definite days and old patients in half-hourly batches, that well qualified assistants should relieve their chiefs, and that the doctors should be paid—with a corollary of a much greater demand upon their time. The present practice was indefensible and unacceptable, both to donors and patients. Moreover, the service was no longer really "free" owing to mass subscriptions of workmen and individual contributions levied upon those who could pay. We had in this country the strongest possible foundation on which to build a really good system, and he would like to see an experiment made by giving a large grant to one selected hospital, conditional on the establishment of as perfect a system as possible, with which the other hospitals would gradually come into line. The fact that a considerable number of hospitals have established canteens for their out-patients is an admission of the reality of the evil. The present time, when the whole hospital service of the country is to come under review owing to changes in local government, may be opportune for a study of the defects in our service, in the light of the experience of other countries. All are agreed as to the want of a better system. From what source the funds for its provision are to come will remain to be considered after some representative committee makes its report.—*The Lancet* **2**: 79, July 13, 1929.

The Fossil Man of Peking

BY SIR ARTHUR KEITH, M.D., F.R.S.

It is possible that many readers of *The Lancet* may be in two minds as the most recent addition to the Gallery of Ancient Man: is "Peking Man" a genuine antique, or is it, as so often happened before, merely a cobwebbed modern replica?

Thanks to the generosity of Prof. Davidson Black, of Peking Union Medical College, I have had exceptional opportunities not only of following the steps which led to the discovery of Peking Man, but also of examining all the documents relating to his authority, and I can assure my readers that they may take Prof. Davidson Black's announcement at its full face value. Without doubt the portrait just discovered is one of the most valuable ever added to the portrait gallery of our fossil ancestry. It takes a place with four others—Pithecanthropus, discovered in Java; Piltdown Man (Eoanthropus), discovered in England; Heidelberg Man (Palæoanthropus), discovered in Germany; and Rhodesian Man, discovered in Africa. In one sense it is more important than any of those just named, because Peking Man reveals affinities to modern (neanthropic) man more than the others do, and has a better claim than they have to a place on the evolutionary line of descent which has culminated in man of the modern type.

That we have obtained a "genuine antique" there can be no doubt; the age at which Peking Man lived was fixed before his actual remains were found; the cave deposits in which his bones lay contain an abundance of fossil animal bones; these date the cave strata as early pleistocene, which on the most moderate of reckonings indicate an intiquity of at least a quarter of million years. Of true mankind at this stage of the world's history we had obtained but two glimpses—both in Western Europe. It is true we had a revelation of very ancient humanity in Java, but the early history of man in that vast region of the old world, which stretches from Western Europe to the furthest end of Asia, remained buried in darkness until Prof. Davidson Black made his first announcement in 1927. We now know what sort of beings lived in distant Asia in early pleistocene time. The characters of this ancient fossil form suggest that it is in Asia we are to find the evolutionary cradle of the European type. We have long wondered where the Cromagnons and other neanthropic peoples who invaded Europe and extinguished its Neanderthal natives came from. The Peking discovery points to Asia as the homeland of our palæolithic ancestors.

Let me outline the course of events which led up to the discovery of the Peking Man—Sinanthropus he has been happily named by Prof. Davidson Black. So long ago as 1903, Prof. Max Schlosser described a fossil tooth from Peking; he could not make up his mind whether it was that of a man or of an anthropoid—so blended in it were both sets of characters. This tooth was part of the stock of a Chinese apothecary, and would have, in the ordinary course of events, been ground to form medicine. In China they unwittingly consume the bones of pleistocene ancestors as medicine; in England we sometimes use them as road metal! Prof. Schlosser's publication simply drew attention to China as a possible home of ancient man; nothing more. The next step was taken in 1920. In that year Dr. J. G. Anderson, a Swedish geologist attached to the Government Survey of China, found himself among the hills to the southwest of Peking, and there at a place named Choua Kou Tien—only 25 miles from the capital—he observed an extensive cave deposit rich in animal remains. He wished to discover the nature and age of the contained fauna. An extensive collection of fossil bones was made, and early in 1926 Dr.

O. Zdansky, a German palæontologist, was sent to Sweden with the collection to examine and identify its various fossil items in the laboratory of Prof. Wiman of Upsala. While so engaged, in the summer of 1926, Dr. Zdansky came across two fossil human teeth—a lower premolar, an upper third (wisdom) molar. When news of Dr. Zdansky's discovery reached Peking, the Geological Survey of China, under an enlightened directorate, and the Peking Union Medical College, under the enthusiastic leadership of Prof. Davidson Black and the financial backing of the Rockefeller Foundation, placed an exploring company in the field early in the summer of 1927. A season's exploration ended on October 16th, by Dr. Burger Bohlin finding, in the matrix of the deposit, a hard travertine rock—the unworn crown of a lower molar tooth—that of a child aged about seven years.

That small specimen was all that was found of the ancient cave-dwellers during the first season's exploration. For Prof. Davidson Black it was sufficient. Those who know teeth recognize in them what ordinary men find in a human face—a multiplicity of features which provide sure guidance to racial identification. Prof. Davidson Black found features on this isolated unworn molar which had never before been seen in the molars of men, ancient or modern. Anthropoid and human features were blended; on the strength of this one tooth he created a new genus of humanity, naming it Sinanthropus, the local Peking representative becoming *Sinanthropus pekinensis*.

To those unfamiliar with dental anatomy this precipitate act of christening may seem both audacious and premature. But the anatomist's sagacity was justified by subsequent events. In the summer of 1928 an expedition again took the field, and an arduous season's work was crowned by the discovery of the following fossil parts: (1) Several large fragments of the cranial wall; these proved that Sinanthropus, like Piltdown Man, had already attained a human size of brain—a brain as large as is given to the lower living races of mankind. In the words of Prof. Davidson Black, "Sinanthropus was a large-brained form." (2) Almost the whole of the right body of a lower jaw—all save the part which supports the lower incisors. (3) The greater part of the lower jaw—including the chin region—of a child aged 7 or 8 years. (4) About 24 isolated teeth.

Many of these fossil parts have still to be extracted from the rock-matrix, but enough has been exposed to justify all the inferences drawn by the anatomist from the single molar. In their actual dimensions and in their arrangement in the jaw, the teeth of Sinanthropus are not materially different from those of an Australian aborigine. The total molar length is 34 mm.—an extent often reached in the dental series of living races. The canine teeth are in no wise ape-like, as were those of Piltdown Man; as in the Heidelberg jaw, they have sunk to the level of their neighbours. Yet in the molar teeth simian features are apparent; some are also to be seen in the details of structure of the cusps and crown. A minute study of the cusps reveals to my eye certain changes which in their nature are identical with those to be observed in the molar teeth of neanthropic man. In spite of their simian features and individual peculiarities the molars of Sinanthropus make a nearer approach to those of modern man than do the teeth of any of other ancient type.

The bony framework of the lower jaw reveals stages in the passage from an anthropoid to a human form. The simian shelf is disappearing; the first rudiment of the true chin has appeared. We see the separation and differentiation of the two elements of the lower jaw—the alveolar element, which is concerned in the support of the teeth, and the basal bony framework, which supports the alveolar bone and gives attachment to muscles. In the ape the alveolar bone predominates and masks the basal element; in modern man the alveolar element has become reduced, thus exposing the enlarged basal framework on which the shelf of the chin is set. In the crudely fashioned mandible of Sinanthropus we have a transitional stage—one in which basal framework and chin are attaining a separate differentiation. The dental canal of Sinanthropus is altogether remarkable; it is very wide, particularly in front, and its walls are clearly differentiated as in the mandibles of anthropoids and as in that of Piltdown Man. As usually occurs in the lower jaw of anthropoid apes, the mental nerves escape by four foramina.

Altogether the characters of Sinanthropus are such as we expect to find in the ancestral stage in the evolution of modern man. Only one feature makes me hesitate in placing him on the line of our ancestry. That is the large size of the pulp cavities of the molar teeth. Sinanthropus shows a considerable degree of that enlargement of the body of the molar teeth and of the contained pulp, known as taurodontism—about the same degree as is seen in the ancestral stage of Neanderthal man revealed by the Heidelberg jaw. Taurodontism reached its climax in the later forms of Neanderthal man. The molar teeth of modern man are not taurodont; they are the opposite; like those of anthropoid apes, they are "cynodont." The bodies of the teeth of modern man are low, and the pulp cavities are shallow. Prof. Davidson Black recognizes the taurodont nature of

the sinanthropic molars, and inclines to the opinion that taurodontism is a mark of early humanity. I cannot share this opinion; to me taurodontism is a form of dental degeneration. I cannot conceive that once this taurodont change had set in the process could have been reversed and cynodontism regained. Hence my difficulty regarding the position of Sinanthropus in the human family tree. I would place him right in a central position at the base of the branch which has given birth to modern races were it not for this feature of his molar teeth. If he is not to be given a position in the direct line of our descent, we must, to account for such characters as we now know he possessed, at least place him at the pleistocene root of the modern branch, and very nearly on the direct line of neanthropic descent.

The Peking discovery reflects credit on all concerned—on Prof. Davidson Black, Dr. J. G. Anderson, Dr. O. Zdansky, and Dr. B. Bohlin. Especially must we recognize the enlightened enthusiasm which brought to their aid the Geological Survey of China, the Peking Union Medical College, and the Rockefeller Foundation.—Sir Arthur Keith in *The Lancet* **2**: 683, Sept. 28, 1929.

The Kenya Skeleton

Sir Arthur Keith, Conservator of the Museum and Hunterian Professor, Royal College of Surgeons, on December 27th, 1929, unwrapped the skeleton of the prehistoric man which was found by the East African Archæological Expedition in Kenya Colony.

Mr. Leakey, the leader of the expedition, was present during the unwrapping, and he heard Sir Arthur Keith express his appreciation of the manner in which the skeleton had been packed embedded in the soil in which it was found, the whole being carefully protected from damage by layers of cotton wool. It arrived intact, but on account of its crumbly state immediate steps were taken to preserve it.

In a statement Sir Arthur Keith said the discovery was an extraordinarily interesting one, but he could not form any definite opinion, as to the race and date of the remains at the present stage. It appeared to be that of a man of about 6ft. in height, and its crouching attitude, with the knees touching the chin, showed that it had been buried in that position, a recognized form of burial and a very ancient one.

The expedition found the skeleton in the very deepest stratum of Gamble's Cave, and they excavated it most carefully, the technique being most exact. The depth at which it was found suggested that the skeleton would probably prove to be the oldest yet obtained from that part of Africa. It was not an extinct type, but was representative of the modern *homo sapiens*. Mr. Leakey believed that it was more ancient than anything yet found in Europe, but Sir Arthur Keith was not prepared to venture an opinion on that point until he had made a detailed anatomical examination and reconstructed the whole man.—*Weekly Times*, Jan. 2, 1930.

A Sculptor of Youth*

A beautiful book has recently appeared describing the work in marble and bronze of that accomplished sculptor, Tait Mackenzie, a professor in the medical school of the University of Pennsylvania. The importance of Tait Mackenzie's sculpture lies in the fact, as Mr. Christopher Hussey says in a critical résumé of Mackenzie's work, that we have here the first considerable attempt since the marvellous accomplishments of Athens to take for the sculptor's main subject the athletic ideal. For many years before his present appointment Mackenzie was director of physical education at McGill University, and in 1894, when he first occupied that chair, he had made few or no attempts in sculpture, though undoubtedly it was then that he was receiving the formative influences which enable him to-day to express his ideals of motion and rhythm in the human body. When, as now, athletics occupy so prominent a place in educational life it is certain that the Greeks have once again shown the way to great accomplishments for those who have the necessary receptive attention, instruction, and fine thought. The contents of Mr. Hussey's book consist largely of excellent representations of Mackenzie's best known work, with a running commentary of appreciation which though enthusiastic appears always to be justified. While the large imaginative groups will command most of our admiration—and rightly so—medical men will be interested in the portrait medallions, for they include representations of, among others, William Osler, Crawford Long, Wilfred Grenfell, Chevalier Jackson, Robert Jones, Weir Mitchell, W. W. Keen, and Charles Brockden Brown. Brockden Brown's chief claim to public interest is that he is always cited as the first American novelist, with the funny suggestion that he imitated William Godwin, but medically speaking he is remarkable in that he wrote in "Arthur Mervyn" a wonderful description of an epidemic of plague from personal observation of the horrors that fell upon Philadelphia at the end of the eighteenth century.—*The Lancet* **2**: 1377, Dec. 28, 1929.

* Tait Mackenzie, a Sculptor of Youth. By Christopher Hussey. London: Country Life, Ltd., 1930, pp. 107. With 14 figures and 91 plates. 25*s*.

Special Correspondence

The London Letter

(From our own correspondent)

Just over six months ago reference was made to a growing demand for a diploma in dentistry, and further evidence of the movement within the dental profession for putting its house in order is shown in the revision and reissue of a report on Dental Treatment and National Health, first published by the British Dental Association in 1920. Despite the offer of dental treatment as one of the additional benefits under the National Health Insurance Acts the number of insured persons availing themselves of this has slowly declined during the last few years and outside the insured class of the population the habit of going regularly to the dentist has never really become as well-established as in America. What happens at the present time is that the child arrives at school very often with bad teeth but during the school period expert supervision is provided and the school dentist has already been able to effect a noticeable improvement in the teeth of school children throughout the country. On leaving school, however, the adolescent does not become insurable for some years nor does he qualify at once for the additional dental benefit and no provision is made for looking after the teeth of that section of the nation which cannot afford a private dentist during this important period. This is one very important reason which has led the British Dental Association to urge the formation of a complete dental service which would also deal with the dental treatment of nursing and expectant mothers, the pre-school child, the child of school age and for adults both under the scope of the Insurance Acts and outside this scope where private fees could not be afforded. The framework of such a public dental service is already in existence, the dental profession itself demands that something should be done and the next step would appear to be with the Ministry of Healh and thence the Government. Preventive work on the teeth of the whole nation might go a long way towards preventing a very great deal of debilitating disease.

The "Brighton Sore-Throat," and psittacosis have provided the profession with many unusual cases during the last few weeks. In the case of the former many examples of an extremely acute tonsillitis occurred in the south coast twin towns of Brighton and Hove. The occurrence of large cervical glands, troublesome relapses and frequent septicæmia has been the main feature of the disease which was eventually tracked down to milk from a dairy renowned for its pure milk supply. A hæmolytic streptococcus was isolated from the milk and a particular farm was discovered to be the source of this where now swabs are being taken of all the cows and attendants. The relapses were interesting and were explained by the fact that as soon as the unfortunate sufferers got over one attack they drank more milk! The second outbreak, that of psittacosis, though more limited in the numbers affected was more serious in its mortality and not so easy to stop. In the middle of last year a couple of cases were reported from Birmingham. The medical officer of one of the London boroughs died of the complaint a few weeks ago and about a dozen cases in all have been reported in the medical journals. In each case there is a story of a sick parrot recently acquired and of South American origin, and the disease has run its usual baffling course with combined pneumonia and typhoid fever symptoms. Parrot fanciers and veterinary surgeons have denied the possible connection between the birds and the disease and as long as the bacteriology is difficult it is impossible to prove that they are wrong. However, now that the cows at Brighton are being carefully inspected it is hoped that some similar supervision of parrots may prevent further occurrence of psittacosis!

It is perhaps a little off the beaten track for medical men to consider arson at all save in its criminal aspects and yet in an interesting study of the last 100 incendiaries admitted to the Broadmoor Criminal Lunatic Asylum the Medical Officer to that institution is able to bring out many interesting points. In fact arson becomes less of a crime from his point of view than a disease. Of the 100 cases 44 were mentally defective and could not be educated while 50 lacked the power of application and were so retarded that their educational attainments were limited. The remainder, supposed to be of brighter intellect, were only superficially so: in fact a feature of all the 100 cases was a lack of education. The greater part of the cases of arson were examples of "stack-firing" where a haystack is set alight and generally speaking the culprit was a labourer of low grade intelligence without the active cerebration necessary to conceive the terrible consequences of the act, the probable loss of life and serious damage. It would seem, therefore, that the prevention of arson is yet one more activity for the practitioner of preventive medicine who can recognize and secure adequate supervision for the morons picked out in the later days of school life in country districts.

ALAN MONCRIEF

London, February, 1930.

The Edinburgh Letter

(From our own correspondent)

The fifteenth annual report of the General Board of Control for Scotland—the old Board of Lunacy—has just been issued. At the commencement of 1929 there were in Scotland 19,031 insane persons. Of these, 2,973 were private patients while 15,985 were maintained by the parochial rates. Seventy-three were in the criminal lunatic department at Perth.

The Board has had for many years the problem of enteric fever "carriers" under its immediate notice. Before these patients were rigorously isolated, they spread the disease far and wide. One person, a farm servant, before she was certified as a lunatic, is known to have been responsible for transmitting the disease to more than one hundred people. With the exception of one male patient, who died in an asylum, all the other "carriers" have been female. At present there are 15 enteric fever "carriers" in Scottish asylums—all women. In addition there are 9 known dysentery "carriers" in the asylums. The Board of Control in association with the Department of Health are at present considering placing these dysentery "carriers" along with the typhoid "carriers" in one asylum. From 1914 to 31st December, 1928, 2,074 "service" patients (who had served in the army) have been admitted to Scottish asylums. Of these 630 have been discharged recovered, 320 have been discharged unrecovered, 113 have been declassified, and 356 have died. The number still under treatment at the end of 1928 was 635. The Board continues to urge the benefits of the Boarding-Out System for harmless patients. This method, under which quiet patients live in specially licensed private dwellings, has been a distinctive feature of Scottish Lunacy administration for the last seventy years. The total expendiure of local authorities on the maintenance of pauper lunatics for the year was £781,586.

Mr. T. B. Macaulay, President of the Sun Life Assurance Company of Canada, has gifted a sum of £30,000 to the Animal Breeding Research Department of Edinburgh University. This is the second munificent gift that has come across the Atlantic for this project. Some years ago the Rockefeller International Board offered £30,000 on condition that a similar sum was raised in this country. This was obtained by the generosity of Lord Woolavington, Lord Forteviot, and other well-wishers of this section of the University. The Genetics Department is in course of completion at King's Buildings, on the south side of Edinburgh, and should be ready for occupation this year. One part of Mr. Macaulay's gift consists of £5,000 for the purchase of a farm where experiments and demonstrations can be conducted. There the theories of the laboratory can be properly tested. The Animal Research Department has a comparatively brief history. Before the War, Professor Cossar Ewart, at the University, and Professor Wallace, at the College of Agriculture, conducted a large number of experiments in connection with cattle and sheep. A joint committee was formed, at the suggestion of the Board of Agriculture, to consider undertaking work in connection with animal breeding research. Unfortunately, progress in this direction was interrupted by the War, and the activities of the Committee were suspended until 1919. Professor F. A. E. Crew was appointed head of the Department in 1920. Mr. Macaulay's gift comes at a peculiarly opportune moment, as owing to lack of accommodation some of the experimental work has been seriously hampered. The provision of the new farm will enable these investigations to proceed. Other parts of Scotland have cause to bless Mr. Macaulay. The Island of Lewis has benefited especially by his generosity. Last summer a new wing was opened at the Lewis Hospital, Stornoway. This consisted of maternity wards with nurses' accommodation and was the gift of this munificent benefactor. He has donated more than £50,000 to the Island for the furtherance of various medical, educational and agricultural schemes. In addition he has gifted a memorial hall to the town of Fraserburgh, and generously supported the Aberdeen Institute of Soil Research.

One of the most serious problems the Department of Health for Scotland has to face is the question of maternity mortality. There were 96,815 confinements in Scotland last year, and one out of every 150 of the mothers died in giving birth to her child. Dr. Parlane Kinloch, the Chief Medical Officer of the Department of Health, has pointed out that Scotland's record in this connection is the worst in the world. Not only do 7 mothers die each year out of every 1,000, but for every one who dies, 14 suffer serious impairment of health. Death is due, in one-third of the cases, to septic infection contracted at the time of birth. In another third, it is due to toxæmias developing during the later months of pregnancy. In the remaining third, it is due to hæmorrhages and to injuries connected with difficult birth. In Edinburgh, during the last two years, the mortality has been 6.6 per thousand, as compared with Glasgow's 8.8 last year—the highest in Scotland. Dr. Robertson, the Medical Officer of Health, is advocating the establishment of antenatal clinics in various parts of the city. Urging a reliable midwifery service as essential, Dr. Robertson points out that between November 30, 1928, and October 31, 1929, there took place 7,389 births in the city. Of these 1,404 were attended by the Queen's Jubilee Institute

of Nurses. The total number of maternal deaths in the city was 53. When the nurses were in attendance the deaths numbered 2. Excluding the cases attended by the Queen's nurses the maternal death-rate for the city was 8.2 per 1,000 births. The maternal death-rate where nurses were in attendance was 1.6 per 1,000 births. Meantime, to show its increasing concern in this serious situation, the Department of Health has distributed reports bearing on the question to the medical practitioners of Scotland, in order to invite their collaboration in arrangements proposed towards improving the maternity service of the country. With a view to ascertaining more exactly the actual causes which lead to maternal mortality and in order to provide further means of prevention, the Department proposes, among other precautions, that there should be an investigation in all areas into the death of every married woman who dies during pregnancy or within four weeks after the termination of pregnancy.

An interesting decision in the administration of the Poor Law has been formulated by the Dunfermline Parish Council. A man suffering from pulmonary tuberculosis has been intermittently in receipt of parish relief since 1923. In the interval several children have been born. The Parish Council has now resolved that, in the event of the man's family being still further increased, it will cease to grant outdoor relief. It is prepared however to take both husband and wife into the Poorhouse, where they will be separated. This decision was affirmed by a vote in the council of 19 to 3. The Parish Council has no intention of applying this as a general principle, and has adopted this procedure because of the man's critical condition, and for the sake of his wife and children. In support of its action in this particular instance, it has been pointed out that there have been several cases, particularly on the able-bodied unemployment relief roll, where children have been born, with no hope of support except through the Parish.

Dr. W. S. Thayer, of Johns Hopkins University, Baltimore, has been appointed Gibson Memorial Lecturer to the Royal College of Physicians of Edinburgh for 1930.

Dr. S. A. Kinnear Wilson, Lecturer in Neurology to King's College Hospital, London, has been appointed Morison Lecturer to the Royal College of Physicians of Edinburgh for 1930.

23 Cluny Terrace, Edinburgh. GEORGE GIBSON

Letters to the Editor

Narcotic Addiction in Canada

To the Editor:

The leader in your last issue on Narcotic Addiction in Canada opens up a very important question. Dr. Blackader, who wrote the article, evidently includes cocaine in his remarks, which is not a narcotic although a most pernicious drug, and he does not mention alcohol which is a narcotic. Perhaps Drug Addiction rather than Narcotic Addiction, would have been a better heading for this most excellent leader.

The moderate use of alcohol is very prevalent and for one individual who exceeds there are thousands who never do so, and this is one of the best arguments against prohibition, which, moreover, does not prohibit, for it is impossible to prevent a man who really wants alcohol from getting it.

In regard to opium and its derivatives, cocaine, sulphonal, veronal, and other dangerous drugs, moderation is much less evident, and he who indulges is only too apt to take more and more and thus to become an addict. All the same, there are a few who can and do indulge in moderation and some very brilliant men have taken opium or even morphia for many years without apparent harm. The late Sir Clifford Allbutt says in his System of Medicine, "A patient of one of us took a grain of opium every night and morning of the last fifteen years of a long, laborious, and distinguished career. A man of great force of character, concerned in affairs of weight and of national importance, and of stainless character, he persisted in this habit, as being one which gave him for his deliberations and engagements tone and strength but no conscious gratification or diversion. The habit had arisen on the not improper advice of a physician, who had found him liable to intermittent "gouty" glycosuria. The opium was continued, however, not on this account, but for its own sake."

In India and some other eastern countries the regular moderate use of opium is practised by whole races and it would be a tragedy if when such decent people were in Canada they could only get their drug from underworld vendors and be looked upon as law-breakers. Any legislation in regard to the sale of such drugs if it is not to inflict a hardship must provide for the needs of such moderate but confirmed addicts.

Education should be the chief weapon against the acquirement of drug habits, and the public (which, alas! must include many physicians and druggists, as they often become addicts) should be fully instructed in every possible way as to the dangers and insidiousness of the habit. As in the case of alcohol this is the best way of treating this social scourge.

When a man has become an addict to any pernicious drug (and by the term "addict" is here meant a person who indulges to an excessive and damaging degree) what is to be done for him? Home or ambulatory treatment is seldom of any use. The will has been so weakened by the indulgence that even if the sufferer wishes to get rid of his habit he cannot will to do so in such surroundings. The desire will soon overcome the good resolve and however closely his friends watch there are always ways in which he can get what he will give anything to have. Thus the treatment of these people must be institutional and even then the chances of recovery are none too bright, and many apparently cured cases relapse. This is specially true of cocaine addicts.

All drug intemperates may be classified into two groups: (1) those who do not want to get rid of their curse and drift on to greater enslavement, and (2) those who are really anxious to get better and will do all that their weakened wills will allow to aid in any treatment that is used.

For the first class, who are really degenerates, there is practically no hope. If they could be certified as insane and shut up in special hospitals or institutions it would be perhaps better for themselves and certainly for their dependents, but this is at present impossible.

But for the second group, who are anxious to be helped, much may be done and, as the Deputy Minister points out, it is quite possible to treat them in existing hospitals. But success here is probable only on one condition and that is that the patient be detained under strict care until he is cured. He goes into hospital probably with the best intentions but if he can leave as soon as he finds the restrictions irksome there is little chance of his receiving any lasting benefit. If, however, the hospital authorities have the legal power to detain him as long as may seem necessary, his outlook is much better and, later on, when he is himself again and able to look back upon the hell that he has come through he will probably thank God that he was prevented from leaving at the time when he so longed to do so.

I would urge the following:—

1. That the strictest government control of the importation and sale of dangerous drugs be continued as under powers given by the Dominion Act of 1903.

2. That the public be educated by pamphlets, the press, and even by public lectures, as to the dangers of the abuse of such drugs.

3. That the necessary legal machinery be enacted for the whole country, as has already been done in Alberta and Nova Scotia, to permit of addicts who have consented being detained in hospitals until they can be safely released.

4. That the few already confirmed addicts should be able legally to get their drug on, but only on, a prescription signed in the first instance by two reputable physicians. It might be well if such physicians were specially appointed by government for this purpose, and to them practitioners would refer any cases where it would seem to be a hardship to hold from them their drug.

I am, Sir,

Your faithfully

R. D. RUDOLF.

Abstracts from Current Literature

MEDICINE

The Large Bowel in Chronic Arthritis. Fletcher, A. A., and Graham, D., *Am. J. M. Sc.* **180**: 91, Jan. 1930.

In this communication, these Canadian authors report observations which confirm their previously formed opinion of the importance of a balance in the diet between carbohydrate, protein, and vitamins. X-ray examination after a barium enema showed abnormal conditions in 65 per cent of 60 patients suffering from chronic arthritis. Atony is sometimes seen through the entire colon, but is more frequently confined to the cæcum, where it may be extreme. In the atonic areas haustral markings are usually absent or much decreased, and the decreased markings may extend throughout the large bowel. The length of the colon may be so increased as to result in change of shape or even extensive looping and redundancy. Under dietic treatment the colon assumes a more normal appearance, particularly when the vitamin content of the diet is high and the carbohydrate content low. The anti-neuritic vitamin is given freely in the form of baker's yeast or wheat germ. Patients suffering from rheumatoid arthritis or osteo-arthritis are, as a rule, much benefited by this diet.

The authors are of the opinion that these observations support the belief that nutrition and chronic arthritis are related. This is not opposed to the infectious theory of causation. Laboratory experience indicates that animals fed on diets which lack certain vitamins are highly liable to infection, and infection may complicate or be a part of a deficiency syndrome. Focal infection was present in many of the patients studied. Malnutrition may favour the development of infection, and the bowel may be the source of the infective or toxic agent causing the disease. Thus we get an explanation of the value of carbohydrate re-

striction in arthritis. Carbohydrate favours the development of deficiency disease; with vitamin B restriction it is difficult to produce the deficiency disease unless carbohydrate is given in excess.

The authors conclude that the abnormalities observed in the colon in arthritics are manifestations of malnutrition; that malnutrition frequently plays a part in the development and course of chronic arthritis; and that the abnormalities found in the colon are markedly improved by dietetic treatment with coincident improvement in the arthritis. W. H. HATTIE

A Clinical Study of Meningococcus Meningitis. Borovsky, M. P., *Am. J. M. Sc.* **179**: 11, Jan. 1930.

Borovsky reports the clinical features of 190 consecutive cases of meningococcus meningitis observed during an epidemic in Chicago in 1927-1928. Half of the cases occurred before the fourteenth year. Males predominated. Multiple cases in one family were rare. Universal symptoms were headache, vomiting, and fever, while rigid neck, Kernig and Brudzinski signs, were present in all cases over one year of age. Herpes labialis and strabismus were more common than either petechiæ or convulsions, which were present in about 6 per cent of cases. The blood always showed a leucocytosis. The organisms were found in the spinal fluid in almost all cases. The mortality was 48.9 per cent.

Treatment consisted in the intrathecal, and sometimes the intravenous, administration of polyvalent serum, administered daily until the spinal fluid became clear. Spinal drainage was further continued until the cells were reduced to one hundred or less. The mortality in 68 cases receiving intravenous in addition to intrathecal therapy was greater than when the serum was given by the latter method alone.

Of the sequelæ, deafness was outstanding, occurring in 16 cases (25 per cent). In 12 cases it was bilateral. The onset was commonly several months after convalescence suggesting scar formation about the auditory nerve.

E. S. MILLS

The Gastric Manifestations Associated with a Spastic Colon. Smith, F. M., Miller, G. H., and Fowler, W. M., *J. Am. M. Ass.* **93**: Dec. 21, 1929.

These authors consider that this association is more frequent than is usually admitted, that there is localized pain in the epigastrium, even simulating peptic ulcer in its burning cramp-like character, but differentiated by bowel symptoms, such as fullness, gas and cramps in the lower abdomen. The distress is not automatically relieved by food or alkalis but rather by bowel movements or expulsion of gas. It is consequently worse if the stools are abnormally hard.

Cases are reported with this condition, unrelieved by appendectomy, intensified by nervous strain, and greatly improved by a smooth colon diet or belladonna. The symptoms even included nausea and vomiting, which usually gave relief.

Examination of the stomach contents usually showed a low free acidity. Roentgenological studies as a rule showed a spastic colon—increased tonicity and peristalsis. The most constant finding was a prepyloric spasm, which the authors claim is more common in patients with this condition.

There is doubtless a reflex connection between the colon and stomach, which animal experiment has proved. The chain of events which produces the symptoms described begins with a hypersensitive stomach and intestines, a stimulation of the colon, and ends with a distended spastic stomach.

P. M. MACDONNELL

Observations on the "Bruit D'Airain" (Coin Sound, Bell Sound). McLaughlin, A. I. G., and Dix-Perkin, A. J., *The Lancet* **2**: Dec. 28, 1929.

An intensive study is made upon the presence or absence of the coin sound in 50 cases of artificial pneumothorax, with particular attention to those factors which influence its appearance or disappearance. The various current explanations are discussed and these theories applied to the actual conditions found in this series. Some are corroborated, others discarded. In the light of the facts noted, it seems that the size of the cavity, its shape, the tension of its contained air, the presence of adhesions and of fluid, are all less important factors than the rigidity of the cavity wall. When the walls are thickened and rigid, then the *bruit d'airain* is present, though its quality and intensity may be modified by some or all of the above minor influences. The development of fluid is important, inasmuch as it is accompanied by a congestion of the pleura (in the acute stage) or fibrosis (in later stages), but does not of itself cause the phenomenon. In certain cases the appearance of an effusion was preceded by and suspected on account of the advent of the coin sound, this being interpreted as evidence of inflamed and more rigid pleuræ. It is considered that the succussion splash, amphoric breath sounds, tinkling crepitations, and the coin sound are variable results of similar physical conditions, and, when found in the same chest, all showed the same pitch of musical note. In displacement of the mediastinum, with corresponding relative fixity and tension of the cavity walls, a faint *bruit d'airain* is heard. Regarding diagnosis, the presence of a coin sound means an air-containing cavity with tense and rigid walls; its absence does not rule out pneumothorax, many cases of which never

show this sign. The sign, when present, may be used to determine the level of fluid in the cavity and in this respect is more accurate than the percussion note which may be quite altered in a hydropneumothorax.

J. B. Ross

The Agranulocytic Blood Picture in Conditions other than Angina. Blumer, G., *Am. J. M. Sc.* **179**: 11, Jan. 1930.

A fatal case of agranulocytosis is reported in a man of fifty-two who suffered from root abscesses in two teeth and an ulcerative periostitis of the thigh. Necropsy revealed no evidence of lymphatic leukæmia. The author cites other similar cases culled from the literature. He concludes that local and general sepsis, in addition to the well recognized group of agranulocytic anginas, may produce an agranulocytic blood picture. The underlying cause of the aplasia is uncertain. The reported case throws no light on the problem of whether the sepsis or the loss of power of the bone marrow to form leucocytes is the primary lesion. Ante-mortem diagnosis of the disease from aleukæmic leukæmia of the lymphatic type can rarely be made.

E. S. Mills

Angina Pectoris: Is it always due to Coronary Artery Disease? McCrae, T., *Am. J. M. Sc.* **179**: 16, Jan. 1930.

The author remarks upon the growing tendency of medical men to regard every case of angina pectoris as indicative of coronary artery disease, if not of actual coronary thrombosis. He believes that in a certain proportion of cases the angina pectoris depends essentially upon extrinsic causes, and does not result from disease of the coronary vessels or the heart muscle itself. In support of his contention he cites a number of cases which bring out the following points. (1) Acute coronary thrombosis may terminate the picture in angina pectoris. In such a case the differences in the clinical picture are usually remarked upon by the patient and obvious to his physician. (2) Angina pectoris may follow acute gastro-intestinal attacks, and may be relieved at once by the passage of the stomach tube. (3) Angina pectoris may recur over long periods, as fourteen years in one case, without definite changes in the action of the heart. (4) It may sometimes be permanently cured by the removal of foci of infection, as prostatitis. (5) Attacks of angina pectoris usually stop when symptoms of myocardial insufficiency make their appearance, contrary to what would be expected if it were due to anoxemia of the myocardium. (6) The pain of angina pectoris may occur in cases of dilatation of the aorta showing no evident disease of the coronary arteries.

It is therefore suggested that in a proportion of cases the clinical syndrome of angina pectoris may be initiated by any one of a number of extracardiac causes, such as a dilated stomach, foci of infection, and dilatation of the aorta. No suggestions as to the mechanism of production of the anginal pain in these cases are offered.

E. S. Mills

The Eczema Problem. Stokes, J. H., *Am. J. M. Sc.* **179**: 69, Jan. 1930.

Stokes, who is Professor of Dermatology in the University of Pennsylvania, has summarized the main points to be observed in the management of cases of eczema as follows. Search for the external excitant, though it may be difficult to find and its removal may avail little. Such excitants may range from printer's ink to seasoning in the soup. Reduce the carbohydrate intake. Know and grease the ichthyotic. Look for dermatophytosis of fingers, toes or groins, as the case may really be one of infection. Try to remove foci of infection and to correct gastro-intestinal troubles. Expect less from sensitization tests, metabolism determinations, blood chemistry, and routine physical and laboratory work-ups, and more from a full history and an experienced appraisal of type. Keep soap and water away, and learn to juggle ichthyol and tars, especially crude coal-tar. Use the roentgen ray sparingly, the quartz lamp often, autohæmotherapy oftener, and calcium in large doses on an empty stomach oftenest. Study the nervous background, but do not fall back on its explanations until the physical person has been completely searched.

E. S. Mills

Amalgamplomben als Ursache von Quecksilber dermatitis. (Amalgam fillings as a cause of mercurial dermatitis). Blumenthal, F., and Jaffé, K., *Deut. med. Wchnschr.* **55**: 41, 1929.

The authors report the case of a female, aged thirty years, who manifested a definite hypersensitiveness to mercury, which was demonstrated by means of skin tests and the Pransultz-Küster method. In such cases the allergic reaction is attributed to amalgam fillings in the teeth. Apparently, the excitation is possible only while the amalgam is soft.

A. G. Nicholls

Primogeniture and Developmental Anomalies. Macklin, M. T., *Human Biology* **1**: 382, 1929.

In this extensive survey of the literature the author disposes effectively of a current superstition, namely that the first born, either in animals or in man is more apt to exhibit abnormalities than any of the subsequent offspring. An English pædiatrician is so firmly convinced of this greater incidence of ab-

normalities among the first born that he says that it is highly improbable that any of the later children will be deformed even if the first one is. Congenital hypertrophic pyloric stenosis he considers as an example *par excellence* of the tendency for defects to afflict the eldest child.

Macklin reviews 1,000 cases from the literature in which the order of birth of the defective offspring is given, and finds that in no instance is there exhibited any increased tendency among the first children toward abnormalities. Many types of defects, such as congenital heart defects, monsters, diaphragmatic hernia, lack of limbs at birth, etc., were included in the survey. Statistical analyses of the curves plotted from the data obtained proved conclusively that the idea that primogeniture *per se* was a cause of developmental defects was absolutely without foundation.

There was also evidence presented that the so-called "congenital" defects are in reality inherited. They are recessive in type, and dependent in many instances upon a complex grouping of determiners, which militates against more than one child in the family exhibiting them. On the other hand, such abnormalities as hernia, hypertrophic pyloric stenosis, anencephaly, hydrocephalus, etc., are apt to be met with in more than one member of a family, thus exhibiting their hereditary nature. Defects that are hereditary are apt to appear in any of the offspring regardless of their order in the family.

MADGE THURLOW MACKLIN

Brittle Bones and Blue Scleræ: Report of a case with glycosuria. Bowcock, H., and Lewis, G. T., *Ann. of Med.* **3**: 700, 1930.

This condition usually shows a history of marked heredity, although sporadic cases occur, of which this is an example. The girl, aged 4½ years, showed deep blue scleræ, and gave a history of numerous fractures since birth. She was unable to walk owing to the atrophic condition of the musculature.

Serum calcium was at the upper limit of normal; calcium and phosphorus were present in abnormally high concentration in the urine and stools, suggesting faulty intestinal absorption. There was an apparent benign glycosuria present, unrelated as far as could be determined to the other condition. Therapy consisted in sunlight, balanced nourishing diet and adequate calcium and phosphorus intake with cod liver oil.

Comment. — Since the fundamental difficulty seems to be not lack of calcification but deficient fibrous matrix, it is doubtful whether any therapy will alter the condition.

MADGE THURLOW MACKLIN

Huntington's Chorea. Worster-Drought and Allen, I. M., *Brit. M. J.* **2**: 1149, 1929.

Nine cases of this disease, occurring in three generations, are reported. True to form, the disease is always hereditary and seldom appears in persons whose parents were both unaffected. In this family there was one instance apparently of a normal person transmitting it; namely a normal father whose two daughters developed choreiform movements at the ages of 10 and 12. These may have been hysterical manifestations, or they may have been the real disease appearing at an unusually early age. There were six females and three males affected in this family. A daughter of a choreic father was born deaf and dumb.

MADGE THURLOW MACKLIN

Familial Polycystic Disease of the Kidneys. Fuller, C. J., *Quart. J. Med.* p. 567, July 1929.

The author describes a family of 27 persons in four generations of whom 9 had polycystic kidneys. The female in the first generation who was affected died in the hospital of "cystic kidneys". Of her 9 children, 7 died young. The remaining two both had polycystic kidneys, the daughter having died in the hospital where a post-mortem examination was obtained, the son showing on examination enlarged nodular kidneys and impairment of renal function. The affected female of the second generation had an affected son, who in turn had a daughter whose kidneys were palpable and nodular.

The affected male in the second generation had 2 normal children, an affected daughter and 2 affected sons. The affected daughter in turn had one of her 4 children affected.

Albumin was present in all the affected persons; pus cells were frequent; red blood cells were present in only one case. Decrease of renal function with age was revealed by the urea concentration tests. The blood pressure in all the affected members was higher than normal.

No unaffected person transmitted the disease.

MADGE THURLOW MACKLIN

SURGERY

Union and Non-Union of Fractures. Bankhart, A. S., *Brit. M. J.* **1**: 9, Jan. 4, 1930.

The author believes that the one common cause of lack of bony union in fractures is absence of hæmorrhage about the broken ends. He points out: (1) that blood is an irritant providing the first stimulus to repair, and (2) that the replacement of the clot by connective-tissue cells derived from periosteum and bone marrow is the first step in the formation of callus. Lack of hæmorrhage may be due to the hæmostatic action of muscle or to senile changes. Infection converts a formed clot to pus and thus its value is lost.

In intracapsular fractures of the femur two

methods are at present employed; operative fixation, and Whitman's abduction. The writer points out that neither is generally applicable. Thirty to 40 per cent of cases treated by abduction failed to develop bony union.

A case of intracapsular fracture of the neck of the femur in a woman, aged 57, is reported. One hour after admission 14 c.c. of blood, withdrawn from the basilic vein, were injected into the hip joint. Extension of the femur was obtained by calipers inserted, under a local anæsthetic, into the lower end. Massage was commenced at once. After nine weeks the patient was allowed to walk in a walking splint.

The advantages are: (1) no general anæsthetic, (2) no manipulation, (3) no immobilization in plaster, (4) early massage, (5) and the development of bony union.

STUART GORDON

Treatment of Pituitary Tumours. *Ann. Surg.* **91**: 29, Jan. 1930.

Favourable response to roentgen-ray therapy is seen in solid, but not cystic, anterior lobe adenomata of the pituitary. The presence of cysts, therefore, is an indication for surgical therapy. Most, if not all, solid adenomata recur within two years after surgical removal.

The writer advises perimetric examination previous to each x-ray treatment. He proposes that all pituitary adenomata be treated by roentgen-ray, under the observation of an opthalmologist and neuro-surgeon; that treatment be stopped as soon as improvement begins; and that surgery be undertaken short of six months, only when visual acuity and fields recede under roentgen-ray treatment.

STUART GORDON

Two Cases of Paraffinoma. Bazin, A. T., *Brit. M. J.* **2**: 1101, Dec. 14, 1929.

Bazin reports two cases in which tumour-like formation resulted from the injection of paraffin or paraffin oil. The first was in a woman of 52 years, who somewhat more than two years previously had been treated for hæmorrhoids by some injection method in which, it appeared probable, hard paraffin had been used. One and a half inches above the anus a hard annular mass, covered with smooth mucosa, and causing stricture was discovered. Extending distally from the constricting ring there were finger-like processes beneath the mucous membrane. A diagnosis of paraffinoma was made, and a resection was done, preserving the lower end of the canal with the sphincters and restoring continuity by rectorrhaphy. The result was quite satisfactory. The second case was in a woman who eight years previously had received three injections of camphor in oil in the subcutaneous tissue of the thigh. At the sites of injection nodules developed. It was determined that the camphor has been dissolved in a paraffin oil base.

Clinical observation and experimental work have demonstrated that mineral oils, when injected into the tissues, may cause the formation of tumour-like masses. The reaction is that characteristic of a non-absorbable foreign body, with fibrosis and giant cell formation. The susceptibility to this reaction varies in different indivduals. Vegetable oils do not produce the same effect. Mineral oils may remain in the tissues eleven months before the tumours appear.

The condition may cause some difficulty in diagnosis. The injected paraffin oil may spread along the lymphatics to the lymph-nodes, simulating tuberculous adenitis or carcinomatous metastasis.

A. G. NICHOLLS

OBSTETRICS AND GYNÆCOLOGY

The Recognition of Early Cervical Cancer. Novak, E., *Surg., Gynec. & Obst.* **50**: 200, Jan. 1930.

All statistical studies point to the conclusion that the duration of the cancer, far more than any other single factor, determines the fate of the patient. The proportion of these early cases which are relatively favourable, should be increased, on the one hand by popular education, on the other, by developing our skill in their early recognition. The profession should put aside the picture of what is really the late cancer lesion, and familiarize itself with the picture of the early cancer lesion.

The diagnosis of late cervical cancer is easy, but it confers little benefit on the patient. It can usually be made by the simplest kind of pelvic examination. The diagnosis of early cervical cancer is often difficult, but it means much to the patient. It requires experience, a careful pelvic examination, including the use of the speculum in a good light, and, in a certain proportion of cases, biopsy and microscopic examination.

Biopsy is indicated if there is an indurated area on either cervical lip, especially if the overlying surface is granular, vegetative or ulcerated, and very vascular. It is also indicated if, in an erosion or ectropion, there is a hardened or raised area with vascularity, sponginess, or tendency to ulceration of the surface. Biopsy may be performed with a sharp knife or punch followed by searing the edges of the wound with the cautery. The tissue should be excised from the most suspicious area, and the sections should be cut in such a manner as to show the mucous surface. The pathological examination should be made by a competent pathologist, preferably by one thoroughly familiar with the special pictures encountered in this field. Most cervical lesions are obviously benign or obviously malignant, so that biopsy and microscopic differen-

tiation need be invoked in only a small proportion, probably less than 5 per cent. If the pars vaginalis is normal in appearance, but the intracervical mucosa seems vascular or granular, the curette may reveal definite intracervical cancer, most often adenocarcinoma. By a careful weighing of the clinical history, the naked-eye picture of the disease, and, where necessary, the microscopic findings, cancer will rarely be overlooked, even in its very early stages.

If, as is most often the case, the suspicious lesion is found to be benign, it should be eradicated by whatever method is best suited to the individual case. Usually some simple procedure, often of the office type, is sufficient. These lesions unquestionably predispose to cancer. Their eradication is the one important contribution we can make to the direct prophylaxis of cervical cancer.

From the standpoint of the general profession, the great need is a readjustment of the clinical concept of cervical cancer so as to include the early pictures. ROSS MITCHELL

Radiology as a Complete or Partial Substitute for Surgery in the Treatment of Cancer of Female Pelvic Organs. Heyman, J., *Surg., Gynec. & Obst.* **50**: 173, Jan. 1930.

Tables are given showing the absolute cure rate in treatment of carcinoma of the cervix under surgical and under radiological treatment, the cure rate in operable cases of carcinoma of the cervix, and the cure rate in operable cases of carcinoma of the body of the uterus.

In cases of cancer of the cervix, radiological treatment is the method of choice. Operation should be resorted to only if radiological treatment has failed.

Operable cases of carcinoma of the body should be operated upon and submitted to post-operative irradiation. Regarding the relatively large group of border-line cases in which surgical interference, on account of general conditions and technical difficulties, is less advisable, one must, in making the choice between surgical and radiological treatment, carefully consider the size and shape of the uterine cavity. Surgical treatment is to be preferred in cases with a large and irregular uterine cavity, whereas radiological treatment is more likely to be successful if the cavity is narrow and of regular shape.

In cases of cancer of the vagina, surgery ought to be entirely replaced by radiology.

In cancer of the ovaries an intimate co-operation between surgical and radiological treatment is required. Surgical treatment, aiming at the removal of the ovarian tumours, must be tried first. In patients who have had the radical operation, as well as in those who have not had the radical operation, operation must be followed by irradiation. In a number of these cases radiological treatment will bring about a considerable improvement and in some it may pave the way for a subsequent successful operation.

In order to be able to substitute entirely or in part radiological for surgical treatment to the extent advocated in this paper, it is necessary to have at one's disposal a radio-therapeutic institution, which, first of all, should be equipped with all technical appliances and instruments for thorough comprehensive roentgen therapy, and radium therapy. Secondly, there should be in addition a well organized department of social service for following up the patients, and, finally, the clinic must be under the direction of well trained and experienced radiologists with an adequate staff.

ROSS MITCHELL.

Further Observations on the Hepatic Lesion in Eclampsia. Diechmann, W. J., *Am. J. Obst. & Gynec.* **38**: 757, Dec. 1929.

The author produced in dogs, by injection of fibrinogen following a full meat meal, lesions in the liver similar to those found in eclampsia, namely, subcapsular hæmorrhage with hæmorrhage and necrosis in the periphery of the lobule and portal vein thrombosis.

It is thought that since the circulation during pregnancy is loaded with placental protein, the increased permeability of the intestinal wall permits of rapid absorption of protein from the gastro-intestinal tract. This might explain a sudden eclamptic seizure following the ingestion of a protein meal, in a patient having no so-called pre-eclamptic symptoms or signs.

One is rather impressed with the danger of not limiting proteins as well as the necessity of proper intestinal hygeine, particularly during the later months of pregnancy.

A. D. CAMPBELL.

PÆDIATRICS

Tuberculin Skin Reactions. Smith, C. H., *Am. J. Dis. Child.* **38**: 1137, Dec. 1929.

This is a presentation of the results of routine tuberculin tests by the Mantoux technique on all patients admitted to the Children's Medical Division of Bellevue Hospital (New York) over a period of eight years. The series comprises 7,668 children, from birth to 13 years of age. About 16 per cent of positive Mantoux reactions were obtained each year and the curves plotted according to age-periods are almost identical for each year. In the age period from birth to six months 3.38 per cent reacted positively; six months to one year, 8 per cent; one to two years, 12.5 per cent; two to four years, 15.6 per cent; six to eight years, 26.3 per cent; twelve to thirteen years, 43 per cent. During one-half of the experimental period simultaneous Pirquet and Mantoux tests were done; the Mantoux gave

more than twice as many positive reactors as the Pirquet. Because of the unreliability of the scratch method, no series based on the Pirquet test should be accepted as showing the incidence of infection. Graphic comparison with statistics from other cities shows a much higher percentage of positive reactors in the European cities and a close correspondence in American centres. This demonstration, that considerably more than half the children of the poorer classes in a crowded community reach puberty without having acquired tuberculous infection, gives to the intracutaneous tuberculin test a wider practical application than has perhaps been accorded it by many.

A. K. GEDDES

The Diagnosis of Tuberculosis of the Tracheobronchial Glands. Armand-Delille, P., and Lestocquoy, C., *Am. J. Dis. Child.* **38**: 1125, Dec. 1929.

The authors stress the importance of early recognition of this condition and the unreliability of many of the usual diagnostic criteria. "Pretuberculosis does not exist; a child is or is not tuberculous." They attach prime significance to a history of exposure, a tuberculous environment serving as the basis of control for the diagnosis of tuberculosis of the tracheobronchial glands. Their evaluation of the usual symptoms and signs is based on a study of transverse sections of the lung and mediastinum in diagnosed cases which came to autopsy. Percussion cannot demonstrate enlargement of these glands; if parasternal dullness is present it is produced by lesions of the subjacent pulmonary parenchyma; interscapular dullness, if found, cannot be due to the adenitis. Auscultation is of no real diagnostic value. The D'Espine sign is of value here only if found below the level of the fifth or sixth dorsal spine.

Diagnosis can be made only by careful roentgenography of the chests of children from tuberculous environments. Plates taken with an exact technique, by a very short exposure, in the frontal and in the lateral positions, must be compared with films made from other cases in which the roentgenographic findings have been checked at necropsy.

A. K. GEDDES

UROLOGY

Cystectomy for Carcinoma of Bladder Base with Restoration of Function. Kidd, F., *Brit. J. Urol.* **1**: 380, Dec. 1929.

The author reviews the older attempts at radical cure of carcinoma of the bladder base by cystectomy, with transplantation of ureters into the skin or into the bowel. He concludes that the results of such operations are highly unfavourable, and he has therefore, turned his attention to new methods. In his search he has been guided by the fact that even in these cases there is likely to be a very appreciable amount of healthy mucosa. This mucosa is capable of covering large defects by virtue of the rapid proliferation of its epithelium, and hence lends itself to plastic operations. Then, too, it is a well recognized fact that, even if a large portion of the bladder be excised, it may regain its capacity almost to its original volume.

Reimplantation of the ureters is rendered safe and easy by the use of the author's special ureteric implantation catheters. These catheters, size 7-14 Charrière, are made of toughened gum elastic, and can be sterilized by heat. The ends of the catheters are pierced by a flute-shaped opening and for some inches are pierced by numerous lateral eyes. Shortly before the last eye the catheter expands into a bulb, half an inch long, which carries two circular grooves at each extremity. The catheter is introduced into the divided end of the ureter until the bulb has just disappeared into the mouth of the ureter. Ligatures are then tied tightly around the ureter, each ligature sinking into one of the grooves on the bulb. The opposite end of the catheter is then guided into the channel into which implantation is to be effected, and this is easily accomplished without fear of interfering with drainage of urine.

After a consideration of these facts the author felt that there were cases of carcinoma of the bladder base, where the patient's health was not too much impaired, in which an excision of the growth and surrounding tissue, including prostate and seminal vesicles, was practicable. The healthy bladder mucosa which remained was utilized to form a new bladder into which the divided ureters were reimplanted. A detailed report is presented of two such cases of malignant ulcerations which could not be treated or had failed to respond to treatment by other methods. Both have been dealt with in the manner outlined, with satisfactory restoration of bladder function.

N. E. BERRY

Small Round Cell Sarcoma of the Bladder with Review of Literature. MacKenzie, D. W., *Brit. J. Urol.* **1**: 359, Dec. 1929.

Sarcoma, unlike tumours of epithelial origin, is a rare affection of the urinary bladder. A review of the literature shows that the average clinic is not likely to encounter more than one or two cases. The author reported one case of small round cell sarcoma of the bladder in 1925, a rhabdomyosarcoma in 1928, and now a second case of small round cell sarcoma. Many of the

cases which have been collected were not classified as to type, but as nearly as can be ascertained the majority were of the mixed cell variety, and in some cases the type of cell varied greatly in different areas of the same tumour.

An analysis of 22 reported cases of small round cell sarcoma is presented. This is considered as covering approximately one-sixth of the total number of all cases of sarcoma of the bladder.

Regarding sex, there are 12 males and 7 females with 2 not specified. The age incidence shows a marked variation in the two sexes. In the first decade, of the 2 cases reported, none occurred in males. From 10 to 20, there were none in either sex. The third and fourth decade were practically equal, but beyond 40 the incidence in males increased rapidly with only a single female case reported.

The symptoms and even the gross appearance so closely resemble the more common epithelial growths that they are usually considered to be such until the specimen comes to microscopic examination. Most of these tumours seem to arise about the base of the bladder, and Caulk states that "the great selectivity of sarcomatous tumours of the bladder for the trigone and at its juncture with the bladder base, in all probability has a great deal to do with faulty seam of fusion of the two fetal surfaces with the mesodermal origin of the trigone." It is also pointed out that in view of the great increase in number of cases in males over forty years of age, that these may be of prostatic origin, and the small round cells closely packed together may simulate in some cases the closely packed carcinomatous tumours sometimes seen in prostatic malignancy.

The prognosis is extremely bad, regardless of the type of treatment. One case reported by Geraghty was well nine years after radical excision. All the remainder of the 22 are dead with the exception of the author's most recent case. This case was that of a man of 54 years of age who had suffered from hæmaturia and dysuria for six weeks prior to seeking advice. Examination revealed a large ulcerating growth on the anterior wall of the bladder, about one inch from the vault and extending down to the vesical neck. It was widely excised and the patient made an excellent recovery. He was then given a course of deep x-ray therapy. He was quite well and there was so sign of recurrence until six months later, when cystoscopic examination showed a small rounded growth, the size of a pea, in the old incision at the vault of the bladder. It was coagulated and excised, and examination three months later showed no evidence of further recurrence.

N. E. BERRY

THERAPEUTICS

The Activity of Stored Antipoliomyelitic Serum in Experimental Poliomyelitis. Burnet, F. M., *Med. J. Austral.* **2**: 851, Dec. 14, 1930.

The value of fresh convalescent serum in the prevention and treatment of poliomyelitis has been abundantly proved, both in the case of human beings and in poliomyelitis experimentally produced in the monkey. It is pointed out, however, that difficulties may arise as a result of the serum having to be stored for a considerable time before need for it arises. On the other hand, when it is needed it must be available immediately, so that storage cannot be avoided.

The writers of this paper take up the question of the extent to which stored serum is likely to be affected by the methods used to keep it sterile. There are different methods of treating the serum so as to assure that it remains sterile. In the Commonwealth Laboratories sterility was obtained by rigidly aseptic technique and filtration through porcelain candles. The final product was sealed in ampoules without the addition of any antiseptic, and stored at ice-box temperature. The experiments carried out were directed towards the virucidal properties of such serum, that is, its power to render innocuous filtrates or suspensions which were known to contain the infection. In addition to this, some observations were made on the activity of serum collected from persons recently convalescent (up to one year), in comparison with the serum of those who had had the disease at a more distant date. The experiments were carried out on monkeys, and the conclusions reached were that human immune serum, prepared according to the technique referred to above, retains its power to protect monkeys against intercerebral injection of active poliomyelitis virus. Further, these virucidal qualities are retained for at least three years when the ampouled serum is stored at ice-box temperature.

No significant difference could be detected between the virucidal properties of sera prepared from persons who had recently recovered from poliomyelitis, as compared with serum from those who had suffered from it as long as three years before.

H. E. MACDERMOT

HYGIENE AND PUBLIC HEALTH

Seasonal and Age Studies of Poliomyelitis and What They Suggest. Aycock, W. L., *Am. J. Pub. Health.* **20**: 41, Jan. 1930.

A previous study led Aycock to conclude that the incidence of poliomyelitis is not a measure of the extent of distribution of the virus, but is largely controlled by existing immunity which

has resulted from previous exposure to the virus. From this observation arose the question as to what determines the result of initial exposure to the virus.

In another study, Aycock found evidence that the distribution of the virus is the same in warmer climates as in colder climates, although the manifest incidence of the disease is greater in cool than in warm climates, and that climatic variations of incidence could scarcely be attributed to corresponding variations in either the facility for transmission or the virulence of the virus. This study indicated that the incidence of the disease varies, as a rule, directly with the magnitude of the change from the colder to the warmer season of the year, but not with the warmth of the climate itself. Seasonal fluctuations in physiological functions are related to the occurrence of certain non-infectious diseases and to susceptibility to certain chemical compounds, while susceptibility to certain infections is influenced by physiological factors which undergo seasonal variations. Such observations led Aycock to the opinion that resistance to poliomyelitis, in the first instance, may lie in a balance between some as yet undetermined physiological processes which undergo seasonal fluctuations, and vary in different climates by way of adjustment of the body to different or changing environment.

To define more clearly this type of resistance, to distinguish it from immunity consequent upon reaction of the tissues to an invading organism, and to direct attention to a neglected form of resistance, Aycock suggests that it be termed "autarcesis"—defined as the power to resist infection which resides within normal physiological functions and does not require the provocation of an infectious agent for its production.

Aycock now submits this conception of the epidemiology of poliomyelitis, in the endeavour to form an idea of the nature of the virus reservoir. The disease is found in every part of the world, and immunity to it is equally widespread. It is reasonably certain that dissemination is by direct person-to-person contact, but there is no evidence that many persons harbour the virus in the upper respiratory passage for a relatively short time, during which nearly all acquire immunity without showing obvious signs of the disease. There is no proof that the virus can be transmitted with greater facility at one season than another. On the basis of an autarcetic factor it is hypothetically possible that an epidemic of an intensity which is seldom exceeded could occur in the summer season without any actual increase in the rate of dissemination of the virus.

It is not to be understood that a moving virus reservoir is necessarily present in every locality at all times. Local epidemics may follow its introduction or presence during the season of anautarcesis (summer and autumn). Or, if a locality has been exposed to a moving reservoir during the season of autarcesis (winter and spring) a wave of immunization might result which would render the community relatively free of the disease for a time.

Aycock presents this conception of the epidemiology of poliomyelitis because, if its validity be supported by further observation, future studies looking to its control must be along different lines from those which have been followed thus far. Indeed we must "turn from the pursuit of the bacteriology (if this term may be applied to a virus disease) and immunology of the disease to an exploration of its autarcesiology in our search for means of prevention."

W. H. HATTIE

Divers, Occupation and Health. International Labour Office, Geneva, 1929, Brochure No. 155.

The brochure on Divers, published by the International Labour Office, is of interest to the medical profession. The subject is considered under two heads: (1) The health of the divers who use no diving apparatus; (2) the health of the divers using various mechanical contrivances.

The first type of diver is the one we commonly read about in connection with the pearl and sponge fisheries. These divers may reach with practice almost incredible depths. In the Mediterranean fisheries it is stated that in many spots the average depth attained is 150 feet. The men descend attached to a flat stone and remain under water 50 to 80 seconds. Under these conditions of short exposure the danger of illness from compressed air is relatively slight. It is stated, however, that the divers on board the small boats very commonly lead a most unhygienic existence from the standpoint of nourishment and ventilation, and that during the off-season their lives are very irregular. There do not appear to be adequate morbidity or mortality data regarding these men.

Divers provided with diving apparatus may descend to much greater depths, of course. Using a special type of diving suit, a diver has succeeded in remaining under water five hours at a depth of 160 metres (525 feet). However, it is uncommon for a diver to descend to such depths, and depths of 200 feet are usually the maximum. At this depth the water pressure is in the neighbourhood of 90 lbs. per square inch (equivalent to six atmospheres). It should be noted that at this depth the pressure is far greater than that ever used in caisson work. The danger of illness from compressed air is greater, therefore, among divers than among compressed air workers. In the prevention of this condition stage decompression is favoured

rather than the uniform method. The divers ascend quickly to half the pressure in which they have been working, and from there to the surface very slowly.

The following list of general precautions has been drawn up for divers: (1) Never exceed 60 metres depth (on an average not below about 52 metres). (2) Regulate stay under water as follows: so as not to be longer than one hour at 15-20 metres, nor more than 3 minutes at 50-60 metres. (3) Decompress slowly. (4) Avoid as far as possible successive immersions. Divers should strip after immersion before undergoing a second immersion in turn with their companions. (5) The diver should not be obliged to walk far or to struggle against the waves. Sunday should be observed as a day of rest for the divers during the sponge-fishing season. Sponge fishers should have a few days' leave every two months. At the end of the fishing season (1 April to 1 October) the workers should have at least 15 days' rest and should be well nourished, to counteract the effects of malnutrition and over-exertion during the season.

Divers in shallow places, where the depth is less than 30 ft., apparently never suffer from compressed air illness. Recent work seems to indicate that the danger of gas emboli is materially decreased if helium is substituted for nitrogen in the air supplied to the divers. Helium is 50 per cent more soluble than nitrogen and diffuses more rapidly, but it has not yet been found practicable to use this mixture in a commercial way on account of its cost.

FRANK G. PEDLEY

Pneumatic Tools. International Labor Office, Geneva, 1929, Brochure No. 162.

This brochure considers in some detail the so-called "white fingers" which usually affects the index finger of the left hand. Studies have shown that quite a number of workers with pneumatic tools suffer from this condition in winter. The neurosis is characterized by pallor, sensation of cold, tingling, and loss of sensation and movement of one or more fingers. It is commonly associated with tremor of the hand. A table giving the differential diagnosis of neuritis, occupational neurosis, chilbains, Raynaud's disease, acroparesthesia, erythromelagia, scleroderma, and "white fingers" is given. A short paragraph deals with the deafness which affects the workers. It is stated that the closing of the external meatus of the ear with plugs of cotton wool or rubber will prevent occupational deafness.

FRANK G. PEDLEY

Copper and Coral, Occupation and Health. International Labour Office, Geneva, 1930, Brochure No. 169.

There has been considerable confusion in the minds of physicians concerning the toxicity of copper. There is no doubt that many of the salts of copper, such as copper sulphate and copper acetate, are actively irritating, and if taken internally will produce severe gastro-intestinal disturbance and even death. There is also little doubt that the fumes from molten copper at very high temperatures, if inhaled, will give rise to chills very much like those produced by zinc. But the chronic effects of copper are not at all understood. Indeed, it is the opinion of many that copper itself does not produce chronic poisoning, and that where such poisoning has apparently occurred the cause has been a contaminating metal, such as lead, arsenic or antimony.

The best known proponent of copper as a poisonous metal is Mallory, who claims to have produced hemochromatosis and cirrhosis of the liver in animals which have been fed copper salts. Other investigators, however, have failed to corroborate his findings.

So far as industrial poisoning by copper is concerned the statement of Bouchardet expresses the general opinion, "Lead does more harm than is feared; copper is more responsible for fear than harm."

FRANK G. PEDLEY

Use of the Type "N" Miner's Gas Mask. Miner's Circular 32, Dep't of Commerce, Bureau of Mines, Washington, 1929.

In mines and other places where poisonous gases may occur it is desirable to have a mask which will protect the individual against a variety of gases. It is unsatisfactory to have a number of masks on hand, each one of which protects against one gas only. The type "N" Miner's Gas Mask might be termed "polyvalent", since it will protect for a period of two hours or more against any of the gases which may occur in mines. Its use, however, is restricted to atmospheres in which a candle will burn, containing more than 16½ per cent oxygen.

The mask is similar to that used by the English and American troops during the World War, and consists of a tightly fitting face piece connected with a canister by a flexible non-collapsible hose. The canister contains, in the order named, a wire screen covered with Turkish toweling, a layer of activated charcoal impregnated with copper sulphate, a layer of activated charcoal, a layer of caustite (a caustic soda preparation), a filter of cotton wool, anhydrous calcium chloride, hopcalite (a mixture of copper oxide and manganese dioxide), anhydrous calcium chloride, and a filter of cotton wool. Ar-

rangements are provided which permit for the flow of air in one direction through the canister, and a valve in the face-piece allows expired air to escape. A timer is attached to the canister to indicate the time it has been in use.

FRANK G. PEDLEY

Motor Vehicle Deaths Mount to 31,500 in 1929. Forney, R. L., *National Safety News* **21**: 17, Feb. 1930.

The mounting death rate from automobiles is commonly attributed to the increased number of cars on the road. It is argued that death rates should be given per 100,000 cars rather than per 100,000 people. Forney has been able to do this, and gives a graph showing the number of automobile fatalities in the United States per 100,000 population and per 100,000 cars. The approximate death rates per 100,000 population and per 100,000 cars from 1918 to 1929 are as follows:

	Deaths per 100,000 population	*Deaths per 100,000 cars registered*
1918	9.6	158
1919	9.8	130
1920	10.4	126
1921	11.6	117
1922	12.3	112
1923	14.8	108
1924	15.8	102
1925	16.8	98
1926	18.0	96
1927	19.5	101
1928	20.6	102
1929	23.0	107

FRANK G. PEDLEY

ANÆSTHESIA

Spinal Anæsthesia for the Head, Neck, Thorax; Its Relation to Respiratory Paralysis. Koster, H. and Kasman, L. P. *Surg. Gynec. & Obst.* **69**: 617, 1929.

Direct applications of neocaine to the cervical cord and medulla in frogs and guinea pigs causes general anæsthesia without interfering with respiration. The writers have induced general anæsthesia by the spinal injection of neocaine in 750 patients without once causing respiratory failure. The great drop of blood pressure which ordinarily results from dilatation of the splanchnic vessels can be compensated for by putting the patient in the Trendelenberg position. This method of causing anæsthesia can be used in any class of patient or operation. Low blood pressure is no contraindication. The writers have operated on patients in whom, from shock or hæmorrhage, the pressure had fallen as low as 55 mm. Unfavourable sequelæ, they consider, are caused, not by leakage of fluid through the puncture hole in the dura mater, but by a slight degree of serous meningitis set up by escape of blood into the cerebrospinal fluid.

W. B. HOWELL

PATHOLOGY AND EXPERIMENTAL MEDICINE

Studies on Experimental Pneumonokoniosis. Gardner, L. U., *Am. Rev. Tuberc.* **20**: 833, Dec. 1929.

It is commonly assumed that tuberculosis, which so often complicates silicosis in its later stages, is acquired in industrial life, and measures directed towards the prevention of tuberculosis in dusty trades provide for the removal of tuberculosis cases from dusty environments, both for their own good and for the good of their fellow workers. It is possible, however, that certain forms of dust (particularly siliceous dust) may possess the property of activating old tuberculous lesions. Gardner's experiments tend to demonstrate this in the case of guinea pigs.

The Rl strain of tubercle bacilli has been found to produce typical tuberculous lesions of a mild type in guinea pigs. The lesions practically invariably retrogress and heal, and are seldom associated with ulceration. Ninety-five guinea pigs were infected by inhalation with equal doses of Rl tubercle bacilli. At serial intervals (mostly from 54 to 206 days) groups of animals so infected were removed to dusting chambers and exposed to one of three dusts (quartz, carborundum or granite). The experiment demonstrated that the inhalation of any of these dusts will reactivate healing tubercles. In the control animals, *i.e.*, those infected but not dusted, the tuberculosis rarely spread to the spleen or liver, and rarely produced ulceration or much caseation, but many of the dusted animals, particularly those dusted with quartz, showed large tuberculous areas in the lungs and microscopic tubercles in the liver and spleen. The renewed multiplication of bacilli appeared to take place only in those tubercles containing considerable quantities of dust. Early experiments with marble dust and soft coal dust showed no activation of tuberculous foci, but some experiments with asbestos dust indicated that it might be a factor in reactivating quiescent tuberculous lesions. If free silica ($Si\ O_2$) is the important agent in this activating process it is not quite clear why carborundum dust should be effective, for carborundum is largely silicon carbide, and contains less than 1 per cent free silica. It is significant to note that the siliceous dust does not appear to activate old tubercles where the bacilli have presumably died, and it might be argued from this that old tuberculosis in men might also fail to be affected.

FRANK G. PEDLEY

Study of the Carbon Monoxide Content of the Blood of Steel Mill Operatives. Farmer, C. J., and Crittenden, P. J., *J. Indus. Hyg.* **11**: 329, Dec. 1929.

An investigation was made of the concentra-

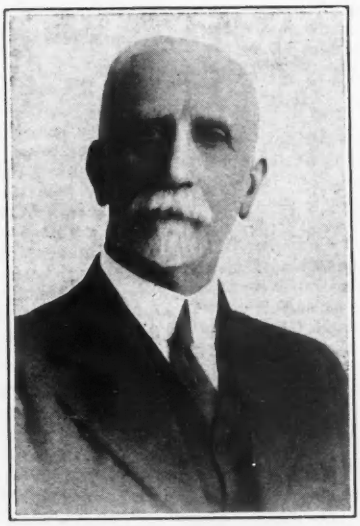
tion of CO in the blood of steel mill workers who were daily exposed to blast furnace gas. The estimation was done by the manometric method of Van Slyke and Neill. The men were examined at the close of the evening shift, sixteen hours later when beginning their shift of the following day, and again at the close of that shift. Fourteen men were examined. The percentage concentration of CO at the end of the first shift varied from 2.5 to 11.3. The following morning before beginning work the concentration varied from 0 to 5, and at the end of the next day's shift the concentration was almost invariably higher than at the end of the first day's shift, and varied from 1.5 to 18.1.

It is evident from this study that the workers examined were never entirely free of the gas. This is surprising, in view of the general impression that CO is rather quickly eliminated from the blood stream. FRANK G. PEDLEY

Obituaries

Dr. Edwin S. Popham, pioneer and well-beloved practitioner of Winnipeg, died at his home on February 11th, after a prolonged illness.

Born in Ottawa, December 31, 1856, he was educated at Victoria University, where he received the B.A. and M.A. degrees. Coming to Brandon in 1883, as principal of the Collegiate Institute, he removed to Winnipeg the following year to be head of the Winnipeg Collegiate. In 1888 he decided to enter the medical profession. Dr. Popham graduated from Manitoba Medical College in 1891, winning an Isbister Scholarship, and took post-graduate work in New York, returning to Winnipeg where he speedily acquired a large general practice. For many years he was Professor of Obstetrics and later of Clinical Medicine in Manitoba Medical College, an institution which was very dear to his heart. He was Registrar of the College over a period which saw it develop from a small institution with limited equipment to a faculty of the University of Manitoba with a rating as a Class A medical school. On the Winnipeg General Hospital he served many years as a member of the honorary attending staff, and later of the consulting staff. Wesley College was another institution which held his interest and which he served in the capacity of chairman of the Board for a long period. He was also a member of the Council of Manitoba University.



Dr. E. S. Popham

Possessed of sound business instinct, Dr. Popham was director of a number of financial organizations. During the latter part of his life he was Medical Director and Referee of the Monarch Life Assurance Company of Winnipeg.

He was a member of the Masonic order, the Carlton Club, and a devoted member of the Methodist Church.

His widow and two sons, Earl C., barrister, of Kenora, Ont., and Dr. Harold E. Popham, of Winnipeg, survive him. One son was killed in the Great War.

No other physician was in touch with a larger circle of Winnipeg people. Highly esteemed both within his profession and outside of it, he was unremitting in his efforts to relieve suffering and zealous in good works.

ROSS MITCHELL

Dr. D. F. Brooks. The death occurred at Palm Springs, California, on January 21, 1930, of Dr. Dwight Frederick Brooks.

The late Dr. Brooks was born in Oswego County, New York, on June 10, 1849. In 1876 he graduated from Long Island College Hospital, New York. Later he practised in Minneiska, Minn. In 1910 he became identified with the lumbering industry in British Columbia and laid the foundations of the pulp industry at Powell River, which has since developed into one of the largest plants in the Dominion.

He is survived by a brother, Mr. A. S. Brooks of Minneapolis, and by three sons, Mr. S. D. Brooks, vice-president of the Powell River Company, Mr. H. K. Brooks, general manager of the Brooks-Scanlon Lumber Company; and Mr. Edward Brooks, of St. Paul, Minn.

The funeral took place at Winona, Minn., on January 26th.

C. H. B.

Dr. Burton Rayworth Field, of Centreville, N.B., died on February 6th. He had attended his practice the day previously and was apparently in excellent health. The following morning he was found dead in bed. Dr. Field was born in Port Elgin, N.B., in 1882. He was a graduate of McGill University, where he led his class in surgery. He had practised continuously in Centreville and enjoyed one of the largest rural practices in New Brunswick. This practice extended also into Maine, chiefly, at Mars Hill, Bridgewater and Monticello. Dr. Field was particularly interested in community affairs, being a school trustee for many years. He is survived by his wife and two children.

Dr. W. E. Gomm. The death occurred on December 17, 1929, of Dr. William E. Gomm, of New Denver, B.C.

The late Dr. Gomm was born on January 10, 1866, at Savannah, Georgia, U.S.A., and in 1888 graduated from the Bellevue Hospital Medical College, New York. He had practised in British Columbia since 1896. While resting between calls on December 12, 1929, a stroke

occurred from which he failed to rally. The high esteem in which he was held in the community which knew him is evidenced by the large number who attended the funeral service on December 20th. At a time when travel is extraordinarily difficult in the interior of British Columbia, friends and former patients from far and near came to testify to their grief at the passing of a real country doctor.

He is survived by his wife, two daughters, and three sons. C.H.B.

Dr. Orton Irwin Grain, a former member of the Manitoba legislature, and mayor of the town of Selkirk in 1896, died on February 2nd of a heart attack, at his home in Winnipeg. He was born in 1863, at Fergus, Ont., and graduated in medicine from Toronto University in 1886. For a time he assisted his uncle, Dr. George Turner Orton, former M.P. for Centre Wellington. Later Dr. Orton removed to Winnipeg, where, with the late Dr. R. G. Brett, he had a contract with the Canadian Pacific Railway for the medical care of the men engaged in construction work. Dr. Grain was employed on this contract visiting many camps in the Rocky Mountains. For a time he was in charge of the sanatorium at Banff, then practised in Manitou, Manitoba, and Winnipeg, until in 1889 he located at Selkirk. He became chief inspector of Indians for the Dominion Government and in this capacity made many long canoe trips visiting Indian settlements. In 1914 he returned to Winnipeg where he practised up to the time of his death.

He is survived by his widow, four daughters, and two sons, one of whom is Dr. Gerald Grain, of Detroit, Michigan. R. M.

Dr. John A. Hutchinson, medical health officer of Westmount for thirty-nine years and one of the oldest practitioners of Montreal, died at the age of 77 at his home on January 24th, after three weeks' illness. He was the oldest civic employe in the City of Westmount.

Born in Musquodoboit, N.S., Dr. Hutchinson was educated at McGill and Edinburgh Universities. Following several years' practice in Bluevale and Wingham, Ontario, he came to Westmount where he had since resided. He was appointed health officer of Westmount in 1890 and fulfilled his duties in that capacity up to the time of his illness.

Dr. Hutchinson was buried with civic honours; some seventy of Westmount's police and firemen formed an escort under Chief Wren and Deputy-Chief Marechal. Mayor George Hogg, two ex-mayors, all the aldermen and most of the administrative staff were present to pay last honours to their former colleague. Many of the medical profession were also present.

Dr. Hutchinson is survived by one son, Dr. John W. Hutchinson of Ottawa, and one sister, Mrs. David Drysdale. The deceased was a brother of the late Mr. Justice Hutchinson, former mayor of Westmount. Hon. Chief Justice Archibald and David Drysdale are brothers-in-law; Dr. E. W. Archibald and Mr. Barker, nephews.

Dr. Walter S. Macdonald, for the past six years medical officer of the Winnipeg Electric Company, died at his home on February 12th after a long illness.

He was born at Wellington, Ont., in 1869, and graduated in 1893 from Western University, London, Ont. Later, he acted as demonstrator in practical anatomy and lecturer in surgical anatomy in his alma mater. Before removing to Winnipeg in 1904 he practised at Demorestville and Picton.

In Winnipeg he was medical officer to the Dominion Department of Immigration until he accepted the position with the Winnipeg Electric Company. He is survived by his widow and three children. Dr. Macdonald was keenly interested in the Manitoba Medical Association.

Dr. J. Rogers died suddenly at Forest, Ont., on January 20, 1930, at the age of fifty-seven. Dr. Rogers had been in ill health for the past two years with cardiac disease. He was born in Belmont, and, after graduation at the University of Western Ontario (1901), practised in Brucefield until coming to Forest eleven years ago. He is survived by his widow, one son and two daughters.

Dr. Peter M. Speed met a tragically sudden death on January 23rd, when, after completing the dressing of an accident case, he dropped dead. During the Great War he served as a lieutenant in a Highland regiment, was severely wounded with shrapnel, and spent eighteen months in hospital. In 1919 he completed his medical course at the University of Glasgow, graduating M.B., Ch.B. After some years of general practice he came to Canada, and spent six months as an interne in the Winnipeg General Hospital, where he was a general favourite. About a month ago he took over the practice, at Benito, Man., of Dr. D. Baldwin. He is survived by his widow and one daughter. R. M.

Prof. R. F. Ruttan. Just as the *Journal* was in press we learned with great regret of the death of Dr. R. F. Ruttan, Emeritus Professor of Chemistry, McGill University, and former Dean of the Faculty of Graduate Studies, which occurred on February 17th. A fuller notice will be given in our next issue.

SPONTANEOUS TUBERCULOSIS IN GUINEA-PIGS.—According to H. A. Reisman and Adelaide B. Baylis, the use, universally adopted, of guinea-pigs for the inoculation diagnosis of tuberculosis may lead to diagnostic errors, as it is possible that a pre-existing tuberculous infection may be present in the animals. Sewal found spontaneous tuberculosis in a notable number of laboratory guinea-pigs which had never been intentionally inoculated with tuberculosis; and Cooper and Petroff have demonstrated the presence of tubercle bacilli in the lymph-nodes of 33 per cent of normal guinea-pigs. The present authors record a series of experiments which they made along these lines on guinea-pigs, the results of which lead to the conclusion that tuberculosis may be present in apparently normal guinea-pigs, and that these animals may have a pre-existing tuberculous focus similar to that induced by inoculation; an intracutaneous tuberculin test will, however, reveal the presence of a tuberculous lesion. The authors point out the importance of this contingency in relation to the various laboratory investigations for detecting tuberculosis in human beings, and they advise that guinea-pigs of uncertain history should be tested with tuberculin before being employed for such purposes.—*J. Lab. & Clin. Med.*, p. 205, Dec. 1929.

News Items

GREAT BRITAIN

The Hospitals and Motor Accidents

The following extracts from a debate in the House of Lords on a bill regarding motor traffic bring out some of the difficulties presented by the ever-growing motoring casualties.

In committee on the Road Traffic Bill, on Decem- 18th, the House of Lords considered Clause 34, which requires every motorist to take out a third-party insurance, or some equivalent against liability in respect of the death of, or bodily injury to, any person caused by, or arising out of, the use of the motor. Lord Luke moved to add words providing that any policy issued under this clause should also "insure to any hospital treating any such bodily injury payment of the cost of such treatment up to a maximum payment of £25. He said that during 1927 the hospitals of the provinces treated, at a cost of £230,000, 26,000 in-patients and 39,000 out-patients as the result of motor accidents. From insurance offices and the patients only £26,000 was recovered. The few hospitals which were near the trunk roads received these cases in excess, in beds which had been provided for local needs. The maximum of £25 which he proposed was at the rate of £4 a week for six weeks. Usually the average weekly cost would not be greater than £4. If such a risk were added to anyone's policy the annual cost would only be about one or two shillings. Hospitals should have this first charge on the insurance.

Viscount Knutsford said this amendment would not deal with all accident cases brought to hospitals through motor accidents, but only with those where the driver was insured against third-party risks and the accident was due to his negligence. If a man who was injured in an accident was taken to a nursing home and treated by a doctor the insurer had to pay the expenses as a liability in consequence of his negligence, whereas if that same patient was taken to a hospital the insurer was not liable, because the hospital had no legal liability to recover the costs incurred by it. Hospitals made no complaint of the burden. They were there to help the injured. He himself had been run over and nearly killed by a motor trolley. He was taken to a hospital. There he was not asked how much he would pay to be treated, and the man who ran him over paid nothing for the treatment at the hospital. A hospital might have to spend much more than £25 in treating a patient.

Lord Bertie of Thame moved an amendment to Lord Luke's amendment. He desired to provide that the payment by the insurance company might be "or to any surgeon or medical practitioner rendering first aid." Doctors who lived near the scenes of frequent accidents complained that they treated persons who not only did not pay, but did not return articles which were lent to them.

Lord Stanley of Alderly said there was a distinction between a hospital and a medical practitioner. There was a common law remedy for the injured person to sue the motorist for damages and the cost of medical treatment. If the injured person were taken to a medical practitioner the claim of that practitioner would be a proper claim against the insurance company. Hospitals were voluntary associations, and as such could not institute an action or make a legal claim against the injured person or the person causing the injury.

Earl Russell said he was aware of the grievance of the hospitals, which had grown in the last two or three years. The comparatively small local hospital had reason to complain, but the amendment proposed by Lord Luke was not the way to remedy that grievance. It was inconsistent with the general scheme of insurance in the bill, and it would not cover all cases. There seemed a unanimous feeling that something should be done, and he suggested that a separate clause should be drafted to provide for the insurance of all motorists, say, by a levy of 5s. on every person who took out a licence. There would be no obligation to pass that 5s. to an insurance company; it could be paid to a central fund, administered for the benefit of the hospitals. He invited Lord Knutsford to confer with him and the Government's advisers before the report stage to see if a separate clause could be drafted. There was the difficulty about hospitals not having a legal claim. They would have to consider if hospitals could obtain a legal claim by altering their rules, or whether the clause should give them a legal claim. He wished to give one word of warning—that if once a hospital which was voluntary began receiving contributions from any source in a manner which was not voluntary it was altering its character in a way which might ultimately expose it to some form of public management.

On behalf of the British Hospitals Association Lord Brentford asked Earl Russell to approach the question from the point of view of the amendment, and not by way of a levy on motorists of 5s. a head, to raise a fund. They required to put hospitals in the position of the ordinary nursing home.

Lord Cecil of Chelwood said that one very serious grievance in country districts was that hospitals provided by the locality were, in fact, utilized by motorists. That grievance would not be dealt with in the manner the House was approaching the question. Country doctors could tell pitiful stories of how the poor were unable to get hospital treatment because the hospitals were filled up with motorists at one period of the year.

Lord Bertie intervened to ask whether Earl Russell would also consider the protection of doctors who were left without payment.

Earl Russell said he thought doctors were protected, as they could sue. An injured person could recover damages, which included medical fees, but in some cases where a patient had been treated at a hospital, although he recovered damages that included medical fees, they were not necessarily paid over to the hospital. He added an assurance that he would consider everything that any persons interested in the matter represented to him.

Lord Luke's amendment, and Viscount Bertie's amendment to it, were then both withdrawn.—*Brit. M. J.* **2**: 50, Jan. 4, 1930.

The Birth-Rate

The fall of the birth-rate continues, though at a somewhat reduced pace. The figure of 16.3 per thousand for last year, given by the Registrar-General, is the lowest ever recorded, and is less than half the figure for the year 1871. In the eighties of last century the rate was 32.3, in the nineties 29.4; when the new century began it had fallen to 27.5 and shortly before the War stood at 23.4. Since then the decline has been very steep, from 21.4 in 1921 to the present figure nine years later. There can be no assurance that the fall has come to an end, and indeed the figure for London, 15.9 shows

that it is still going on. It seems certain, therefore, that birth-rate and death-rate will approach still closer together and that the natural increase of population by births over deaths will disappear.

The National Radium Trust

A meeting of the National Radium Trust was held recently at the Privy Council Office under the chairmanship of Lord Parmoor. It was reported to the Trust that the Radium Commission had arranged for the allocation of the first 5 grams of radium bought by the Trust, and that further supplies would be needed to meet impending demands. The Trust accordingly decided to proceed with instructions for the delivery of a further 5 grams of radium, for the purchase of which arrangements have already been made.

The Trust also decided to exercise the option to buy the 4-gram "bomb" which was lent to them gratuitously for a period of three months by the Union Minière Belge, and is now in use at the Westminster Hospital.

Tuberculosis Study Scholarships

During the summer of 1928 a number of Canadian medical men, engaged in tuberculosis work, made a tour of Great Britain and the Continent, visiting the more important tuberculosis institutions, studying methods of treatment, and becoming personally acquainted with their European and British colleagues. They were enabled to make this tour, which was a great success both socially and professionally, with the help of scholarships granted by the Sun Life Assurance Company of Canada. The Company has now offered through the Joint Tuberculosis Council 50 scholarships of £100 each to British medical men, engaged in tuberculosis work, who would like to pay a return visit this year to Canada and the United States. The duration of the tour will be from Friday, August 8th, to Friday, September 12th. The itinerary, which has been planned by Dr. R. E. Wodehouse, secretary of the Canadian Tuberculosis Association, includes Quebec, Montreal, Ottawa, Toronto, Muskoka, Winnipeg, Ninette, Chicago, Detroit, London, Hamilton, Buffalo, Syracuse, and New York. Visits will be paid to many notable centres in both Canada and the United States and the scholars will reach Winnipeg at the time of the annual meeting of the British Medical Association.

Science and Street Accidents

The conference on London street accidents, which was convened recently by the Minister of Transport, produced by its speeches some good reading. But it was chiefly remarkable, in the eyes of the ordinary man, for the number of suggestions which were declined, and for the light thrown upon traffic problems by the more authoritative speakers. One of the things which seems obvious to the ordinary man is the advisability of tests for the motorist. Another is the risk of allowing a driver to cut in between the kerb and a stationary tramcar loading or unloading passengers. Sir Henry Maybury advanced reasons against tests, while an Assistant Police Commissioner showed that there are objections even to banning cutting-in by precise regulation. The resolutions which were passed were fairly obvious checks on risk. Possibly the conference advanced what is called the scientific study of traffic problems, which have certainly an increasing number of students, scientific or otherwise, both in London and in the country. Unfortunately there are few practical psychologists; and practical psychology must somehow be brought to bear if the motorist and the pedestrian are to be reconciled without mutual loss or damage.

St. Bartholomew's Close

The Governors of St. Bartholomew's Hospital have acquired St. Bartholomew's Close, which was part of the original foundation of the neighbouring church of St. Bartholomew-the-Great. The Close is built over with shops, offices, and warehouses. Hogarth was born there, and it was his early association with the hospital that led him to paint the famous wall pictures on its main staircase representing the Good Samaritan and the Pool of Bethesda, for which he was made a governor. The purchase of the Close is part of the great reconstruction scheme of the hospital now in progress. In this reconstruction the historic Henry VIII. gate, which is the chief entrance (it was rebuilt in 1702), is to be preserved, and also the small church of St. Bartholomew-the-Less, immediately inside the gate, which was originally founded by Rahere as the hospital chapel. No part of the hospital as built by Rahere is standing, though the present building covers the site.

British Red Cross Clinics for Rheumatism

The Queen opened the first of a chain of British Red Cross clinics, which it is hoped, will extend across the country, to fight rheumatism, on February 25. The first is at Regent's Park and is capable of dealing with 400 cases daily. A Government report comments that rheumatism is responsible for one-sixth of the total hours of work lost through illness.

Prof. H. L. Callendar, F.R.S.

Professor Hugh Longbourne Callendar, F.R.S., Professor of Physics at the Imperial College of Science, South Kensington since 1902, died last week at the age of 66, Professor Callendar did a great deal of research work, especially in the measurement of heat and radiation and in steam at high pressures and temperatures. Recently he had been engaged in measuring the properties of steam up to 4,000 lb. pressure. He was the author of several technical works with illustrative tables and a system of "cursive shorthand," and he had made valuable scientific investigations for the Air Ministry. He was elected in 1899 a Fellow of the Royal Society, which awarded him the Rumford medal in 1906. He was made C.B.E. in 1920. Professor Callendar was Professor of Physics at McGill University prior to joining the Imperial College of Science.

The Nichols Prize—Third Award

In accordance with the will of the late Dr. Robert Thomas Nichols, the Royal Society of Medicine offers every three years a prize (being the accumulated interest on £2,200) open to any British subject, for the most valuable contribution towards "The Discovery of the Causes and the Prevention of Death in Childbirth from Septicæmia".

Work submitted for the third award must reach the Secretary of the Society (1 Wimpole Street, London, W.1.) not later than October 1, 1930, and must be marked "Nichols Prize". It must be typewritten or printed, in English, and accompanied by the name and address of the author.

Work already published may be submitted, provided that publication was not earlier than October 1, 1927.

If no work of sufficient merit be submitted, the prize will not be awarded.

Norman Gamble Fund and Research Prize

The Council of the Royal Society of Medicine has accepted, as a trust, the sum of one thousand pounds (£1,000), presented by Mr. Norman Gamble for the purposes of providing a prize of £50 every fourth year for the best original work in Otology carried out during the preceding four years, the balance of the fund to be used for the purpose of awarding grants in aid of research work in Otology. The prize is open to any British subject, whether lay or medical.

Copies of the Regulations governing the awards can be obtained from the Secretary of the Royal Society of Medicine, 1 Wimpole Street, London, W.1.

The Committee of Award will consider applications for the prize and for grants in aid of research work in October, 1930. Applications for the prize and for grants in aid must be received by the Secretary of the Royal Society of Medicine not later than September 30, 1930.

The Royal College of Physicians, Edinburgh

At a meeting of the Royal College of Physicians of Edinburgh on Tuesday, February 4, 1930, the President, Sir Norman Walker, in the Chair, several new Fellows were elected.

Dr. David Rorie, D.S.O., was appointed Dr. Alexander Black Lecturer for 1930.

The College arranged to send a message of congratulation to the Royal College of Physicians and Surgeons of Canada on its erection.

NOVA SCOTIA

Dr. T. I. Byrne has been appointed Provincial Health Officer in succession to Dr. George A. MacIntosh, who has resumed his duties as medical superintendent of the Victoria General Hospital, Halifax.

It is expected that work on the new building for the Halifax Infirmary, and also on the nurses' residence building of the Halifax Children's Hospital, will be commenced in the near future. The plans for the Infirmary provide for the accommodation of about a hundred private patients.

Hon. Dr. George H. Murphy was elected to represent the County of Halifax in the Nova Scotia House of Assembly, on January 21st, by a majority of more than 5,000. This is said to be the largest majority ever received by a candidate for either the provincial or federal parliament in this constituency. Dr. Murphy is a minister without portfolio in the provincial government.

Reports on last year's activities of the Victorian Order of Nurses indicate substantial progress in every centre where this excellent Order is established. As years go by, the Victorian Order nurse becomes more and more firmly entrenched in the favour of both the profession and the public, and the service she renders is being more and more appreciated.

The announcement comes from an authoritative source that it is the intention of the provincial government to proceed shortly with the construction of an additional infirmary building at the Nova Scotia Sanatorium, Kentville. It is said that the new building will provide accommodation for approximately one hundred patients. It is to be of fire-proof construction and designed in keeping with the most modern ideas relative to sanatorium planning.

In the elections held recently in the various towns of Nova Scotia, five members of the medical profession were elected to the mayoralty: Dr. F. R. Davis, of Bridgewater; Dr. T. C. Lockwood, of Lockeport; Dr. F. S. Messenger, of Middleton; Dr. H. B. Havey, of Stewiacke; and Dr. O. B. Keddy, of Windsor. Of these, Drs. Lockwood, Havey, and Keddy are veteran mayors. Seemingly it will not be many years until only the oldest inhabitant will be able to recall the time when Dr. Havey was not mayor of Stewiacke.

The annual report of the Harbour View Hospital, Sydney Mines, is one of the best issued since the hospital was opened, twenty-two years ago. There were 336 patients admitted to the medical wards and 343 to the surgical wards. Hospital days numbered 11,376; surgical operations, 343; radiographs, 324. Some notable improvements were made to the building, and final payment was made on an adjoining lot of land which has been acquired in order to allow of future extension. The financial statement, showing a substantial balance on the right side of the ledger, is the most satisfactory that has been submitted for a number of years.

One of the features of the recent by-election campaign in Halifax County was the support promised by both sides in forwarding social legislation. Old age pensions, mothers' allowances, and a minimum wage for women, are seemingly measures which lie close to the hearts of leaders of both political parties. Some members of our profession expressed uneasiness lest state medicine should be suggested at a time when such unusual unanimity in respect of social measures prevailed. So far, however, there has been no evidence of a desire for very radical control of medical practice in this part of the Dominion.

Mr. A. J. Mackay has been appointed resident superintendent of the Nova Scotia Training School for the Feeble-minded, now under construction near Truro. Both Mr. Mackay and his wife are graduates of the training school of the McLean Hospital, Waverley, Mass., and they were for several years in charge of the Cape Breton County asylum for the insane, where both showed much executive ability. For a few years past, Mr. Mackay has been associated with the Children's Aid Society, of Sydney, and the Child Welfare Division of the Department of the Attorney-General of Nova Scotia. He has thus had a varied experience which should be of much value to him in his new position. The medical and educational work of the institution will be under the direction of Dr. Clyde Marshall, Provincial Psychiatrist.

At the January meeting of the Nova Scotia Institute of Science, papers were presented by Drs. O. S. Gibbs and E. Gordon Young, of the Dalhousie Faculty of Medicine. Dr. Gibbs reported the results of an investigation into the parts of the body surface affected by paraphenylenediamine — a dye used by furriers and also by persons who are dissatisfied with the colour of their hair. Contact of this substance with the skin of some persons produces œdema of the head and neck, but it has been believed that the skin of other parts is not similarly affected. Dr. Gibbs, however, has been able to produce œdema in the leg of the cat, thus showing that the area subject to this action of the dye is not so restricted as has been supposed. Dr. Young also described the investigations he has made for the purpose of determining the best and cheapest method of producing pure alcohol for processes which do not require a highly dehydrated product.

W. H. HATTIE

NEW BRUNSWICK

During the last month, the new children's wing has been opened at the Saint John County Hospital. This wing was provided through the generosity of Mr. A. J. Nesbitt. The wing, itself, is a distinct advance, for it will be used exclusively for the treatment of children, and to this end a multitude of details have been provided, so that each young patient may receive the best advantages while under treatment at the hospital. Mr. Nesbitt gave a large part of his own time to the supervision of the building during the construction, and with Mrs. Nesbitt and his family took part in the opening ceremonies which were extremely simple. The new building was accepted on behalf of the Commission by Dr. S. H. McDonald, Chairman of the Board of Commissioners. The removal of the children from the present older building to the new wing will allow of the accommodation of many adult patients who for some time have been on the waiting list of the institution.

A meeting of the Executive of the New Brunswick Association was held in Saint John, January 29th, at which, besides the Saint John members, Dr. C. J. Venoit and Dr. Alex. Bell, of the North Shore, were present. Routine business was dealt with and further details as to the program for the Fiftieth Anniversary Meeting completed. A flattering response has been made to the invitations extended to certain celebrated speakers.

Dr. W. F. Roberts has been elected chairman of the Saint John Health Centre, to succeed Dr. G. A. B. Addy.

Dr. W. M. Jenkins, Gagetown, is the first president of the Queens County Board of Trade.

A. STANLEY KIRKLAND

QUEBEC

The Seventh Annual Report of Dr. Alphonse Lessard, Director of the Provincial Bureau of Health, was made public in February last and makes interesting reading. He considers that the Province of Quebec has been making as much progress in matters of health since 1922 as in other fields. To be sure, much remains to be done, but when the last seven years was reviewed there could not but be satisfaction and encouragement felt.

On the matter of tuberculosis Dr. Lessard points out that 1923 and 1924 saw the organization and functioning of the district anti-tuberculosis dispensaries; in 1925 came the establishment of the division of demography; in 1926 there was the establishment of the first county health units, which developed in a remarkable manner in 1927 and 1928; while in 1929 there was inaugurated the method of placing in families in the country children menaced by tuberculosis in their own homes.

In regard to the latter system, Dr. Lessard points out that this was commenced in France twenty-five years ago by Professor Grancher. He comments:

"All those who have been engaged in the fight against tuberculosis are agreed on the principle that victory may be assured only when the child can be protected from infection."

The system consists in detecting children from 5 to 12 who are in families where cases of open tuberculosis are present, this work being done by the tuberculosis dispensaries, and placing the children in the rural sections.

"It has been proved that such children, if left in their own families, become tuberculous in the proportion of 60 per cent and that 40 per cent of them die victims of the plague, whereas if they are permanently placed in the country, the proportion becoming tuberculous falls to less than 1 per cent."

In France, he notes, one-third of the children placed in the country become so attached to the soil that they remain there.

In the matter of hospitalization of tuberculous people, Dr. Lessard lays it down that the number of beds available should be equal to the number of deaths of which tuberculosis is the cause. Six years ago there were only from 300 to 400 beds and 3,000 deaths, but thanks to Government aid the number of beds will soon reach 1,600, which is only half of what is needed, but he says there is excellent reason for believing that in a few years the 3,000 beds required will be available.

The Health Bulletin published by the Health Department of Montreal, gives among other things the following information.

Contagious diseases reported last year in Montreal numbered 15,488 as compared with 14,713 cases during the year 1928. Of diphtheria there were 1,254 cases; scarlet fever, 3,135; measles, 2,471; tuberculosis 2,306; chicken-pox 1,835; whooping cough 1,988; mumps 1,488; typhoid fever 98; small-pox 40; influenza 273; with several other diseases mentioned, including 37 cases of infantile paralysis.

The heaviest contributor to mortality in the city was tuberculosis with 961 deaths; influenza came next with 435 deaths, and diphtheria was third with 146 deaths.

Infantile mortality, that is of children up to one year of age, showed a falling off of 218 in 1929. The figures for the year are 2,701, as compared with 2,919 for the year 1928.

Statistics are also given on the number of persons hospitalized during the year at the city's expense, under the Quebec Public Charities Act: Hospitals, 11,951; sanatoria, and hospitals for tuberculosis, 268; orphanages, 427; homes, 471; crèches, maternities, and day nurseries, 11,409, making a total of 34,525.

St. Mary's Hospital, Montreal, will open its doors to the public within a short time, on a new basis, following the appointment of a controlling board of directors and the culmination of an agreement with the community of the Grey Nuns.

With a capacity of 50 beds, five private rooms, the hospital admitted 3,663 patients from August 8, 1924, to October 10, 1929, during the five years of its operation. Hospital services were distributed as follows: medicine, 1,430; surgery, 1.482; gynæcology, 304; eye and ear, 47; nose and throat, 400.

Ten thousand automobile accidents, 180 persons being killed and 2,691 injured, occurred in the Province of Quebec during the course of 1929, while for 10 months of the previous year, from March 1 to December 31, there were 5,856 accidents reported, 70 being killed and 1,560 injured. A decrease is recorded

during 1929 for the number of accidents at level crossings.

The figures for 1928 cannot be accepted for the purposes of comparison with 1929, the great difference which exists between the two being principally due to the better observance of the law which provided for the making of reports of all accidents.

The law became better known and was better observed in 1929 than in 1928, and that explains why twice as many reports were received in 1929 as were sent in in 1928. In general, however, the figures show that there were more accidents in 1929 than in 1928, that more people were killed, that more were injured and that the material damage sustained was more extensive.

Plans have been perfected by the Royal Victoria Hospital, Montreal, for the erection of a residence for internes. The building will accommodate about forty, and will have lounge, library, and recreation rooms. The cost will be about $100,000. The completion of this building will liberate much needed space in the hospital proper. It is said that this residence will be the only one of its kind in Canada.

Some difficulty has arisen between the City of Montreal and the representatives of the new Jewish hospital in Montreal. The city had refused a building permit, but, on behalf of the hospital, a writ of mandamus was taken out in the Practice Division of the Superior Court. The city filed a written consent to judgment granting the writ, and has, in consequence undertaken to give the necessary permit.

Application for a building permit followed on the heels of the campaign conducted last fall to raise $1,000,000 for the construction of a Jewish hospital in Montreal. The campaign was so successful that, including a grant of $300,000 by the provincial Government, nearly $1,600,000 was raised.

The new hospital is to be erected on the Cote des Neiges Road.

Dr. C. A. Porteous, of the Verdun Protestant Hospital, Montreal, announces that presently a clinic for nervous disorders, known as the "Burgess Pavilion," is to be opened. The new building will be modern in every respect with a capacity for 24 patients, each to have private room with bath; the pavilion will have modern hydrotherapeutic equipment, and will enable the latest methods of therapeusis to be applied for patients who can pay for privacy and needed rest while being treated. The rates will be moderate considering the type of accommodation, and will not exceed those in any of the latest private sanitaria to treat neuro-psychiatric cases. It is expected that the pavilion will be open sometime in March.

In September the Eleventh Congress of the French-Speaking Physicians of North America will be held in Montreal. One of the important topics to be discussed is "Longevity."

ONTARIO

An event of historical interest took place in Toronto recently when a portrait of Dr. Augusta Stowe Gullen, the first woman to graduate in Medicine from a Canadian university, was presented to her by the Medical Alumnæ of the University of Toronto. Dr. Gullen forthwith presented the portrait to Dr. Warner Jones, the President of the Academy of Medicine of Toronto, who received it on behalf of the Fellows of the Academy. The presentation followed a very successful banquet and was accompanied by an address the text of which follows, read by Dr. Edna M. Guest.

The portrait is hung on the walls of the Academy in a very dignified and appropriate place beside that of the late Dr. R. B. Nevitt, who was at one time Dean of the Women's Medical College, now no longer in existence.

ON THE PRESENTATION BY THE MEDICAL ALUMNÆ TO THE ACADEMY OF MEDICINE, TORONTO, OF THE PORTRAIT OF THE FIRST WOMAN TO GRADUATE IN MEDICINE FROM A CANADIAN UNIVERSITY — DR. AUGUSTA STOWE GULLEN.

Mr. President, Sir Wm. Mulock, Dr. Gullen, Fellows of the Academy and Guests.

This is a very happy night, Mr. President, for the women physicians, and for the women undergraduate students of medicine, and it is a privilege, which does not lack appreciation on my part, to be allowed to present at this meeting on behalf of the Medical Alumnæ the portrait of our first woman to graduate in medicine from a Canadian University—Dr. Augusta Stowe Gullen.

Some of us who have been interested in the history of medicine, and particularly in the history of women in medicine, have in our dreams, as we sat by a flickering fire, watched women in medicine come and apparently go—come and vanish again, only to return in better form, in the different countries of Europe, from prehistoric times to the present. In our musings we have lived again with our earliest predecessors, and we have realized that it may be plausibly maintained that prehistoric women had a real share in the foundation of our pharmacopœia, in the selection of the hundreds of drugs known to the medical lore of the first civilized people, for did not fall to her lot the gathering of seeds and herbs and the selection and preparation for use of all vegetable foods? Ages and ages of patient and dangerous experimentation must have been required in order that a diet might be established and the edible plants differentiated from the injurious or indifferent, in order that poisons might be recognized as such, and in order to make clear that some poisons taken in certain quantities proved beneficial. These prehistoric peoples handed down a rich supply of known drugs to the Egyptians, whose extensive knowledge of drugs became so well known. Homer refers to Helen of Troy's special knowledge of the pain-subduing drugs, and down through the ages we can trace woman's influence on the pharmacopœia through the Babylonian period to the ancient Greeks and Romans—until scandal hints that two notable ladies, the wife of Guiscard, and the beautiful and spirited Stephania, acquired their skill in toxicology in the Hippocratic city!

In the 12th and 13th centuries we follow with interest the place taken by women in medicine in the first three great universities of Europe at Salerno, Bologna, and Paris. Early in the growth of the first of these European universities, the ladies of Salerno became famous, and among others the names of Abella, Mercuriada, Rebecca Guarna, and the somewhat dubious Trotula, are handed down to us as the authors of scientific works of note. We must not, however, think that these were the first women who contributed to medical literature, for Galen, in whom Greek medical science reached its culmination, referred respectfully to

Antiochis of Tlos in Lycia in the second century, and to her prescriptions, while Heraclides, the greatest of the Empirics, honoured the same lady about 75 A.D. by dedicating a medical treatise to her. Metradora also deserves special mention as an author, a little later, of the first medical work by a woman that has come down to us—a Greek treatise on diseases of the uterus.

And so we may muse, and live again with renewed inspiration the lives of our much respected predecessors, even through the more or less silent ages from the 14th to the 18th centuries when, as a wireless transmitting a message from a distant ship in distress, their message seems to fade, only to come back to us strong and clear, in Northern Europe, in America, in the British Isles, and in our own Canada.

In Canada we find there was born at South Norwich, Ontario, in 1831, a little girl, who later became Mrs. Emily Howard Stowe, a woman of great force of character, undaunted courage, and by temperament a pioneer, who after proving herself the successful mother of three children, found her thirst for an education which would enable her to help other mothers and children still so strong in her that she was impelled to steal quietly across the border to the south of us, to a school of medicine where women were admitted as students. In 1867 she graduated and returned loyally to her native soil to serve her countrywomen, but it was not until 1880 that she was admitted a member of the College of Physicians and Surgeons of Ontario, when she became the first woman physician permitted by licence to practise medicine in Canada. During these years, she and her only daughter Miss Augusta, became inseparable pals, and, with a spirit almost beyond the imagination of any but the true pioneer, she urged her daughter to follow the trail and to break through the early convention of this country. And so it happened that just fifty years ago this past October, and one year before her mother got her official licence to practise, a shy and sensitive young girl in her teens, collecting all the courage she could muster, went forth to register in the great friendless halls of a man-inhabited college, and she carried on, though she admits wet lashes closed her eyes on many nights from sheer loneliness. In 1883 she graduated from our own Toronto School of Medicine, which at that time was in affiliation with Victoria University. This demure and timid girl is now the charming, buoyant, and delightful woman whose portrait we are about to present.

Dr. Augusta Stowe Gullen
(From a painting by Allan Barr)

Through all these years she has been a happy inspiration to those of us who have found, when we grew to the age of cognition, that we too, fortunately or unfortunately, had been born with that indescribable something which impelled us to join the trail which she and her mother and the pioneers of other lands have blazed so well for us.

Perhaps a very tangible proof of the respect which Dr. Gullen's women associates in her profession have for her has been shown in the ease with which the funds have been raised which have enabled us to procure the services of the artist of our choice to paint this portrait for us, for although representatives of other women's organizations very generously offered to swell our funds, we chose to keep this a very personal tribute from the women physicians who have graduated from what has become her own Alma Mater, and women physicians who have come to live in our city,—graduates of other schools of medicine.

And I assure you, Mr. President, our happiness was complete when we received that charming little note from the Secretary of this Academy of Medicine last spring, saying you would be happy to arrange a meeting this autumn at which this portrait, when completed, might be unveiled. With the gallantry of the knights of old, you have listened to our plans and have allowed us to have as special guests on this happy occasion the friends of our choice, Sir William Mulock, our much loved Chancellor of the University; Miss Addison, Dean of Women of Victoria University—the university which conferred the first medical degree on a woman in Canada; Dr. Alexander MacPhedran, a member of the first faculty of the only women's medical college in Canada (1883-1906); Dr. Gibb Wishart, Secretary of this women's medical college, who with Dr. G. B. Smith, another guest of the evening, has been a life long friend of women in medicine; Mr. Allan Barr, our artist, whom all who frequent Toronto's Art Gallery know very well indeed; and Dr Stowe Gullen's husband and comrade through life, Dr. J. B. Gullen, a courtly gentleman and a charter member of this academy.

Dr. Gullen: it is not the professional advantages you have as our pioneer provided for us which makes us appreciate you most, but it is your optimism, your delightful sense of humour, the brilliant mentality which has not only kept you a successful physician, but has made you a leader of society, a member of the Faculty of the Ontario Medical College for Women, one of the three first women to sit on the Senate of our University, one of the first women in Canada to sit on a Board of Education, one of the most unselfish of leaders in any cause which is for the benefit of women and children, and, not least, one of the most successful and charming homemakers.

It is the greatest pleasure to present to you this portrait on behalf of the Medical Alumnæ of the University of Toronto, and of members of other Medical Alumnæ who are living in our city, and to present to you this sheaf of roses, which carries with it from your associates all that the red rose means.

On behalf of the Medical Alumnæ,
University of Toronto.
EDNA M. GUEST, M.D., *President.*

To The President, Dr. W. Warner Jones, and
Fellows of the Academy of Medicine, Toronto.

MANITOBA

On the evening of February 7th, under the auspices of the Winnipeg Medical Society, a gathering of 350 prominent citizens of Winnipeg—laymen as well as medical men and their wives—met in the Royal Alexandra Hotel. The idea of the meeting was to do honour to Dr. and Mrs. W. Harvey Smith and to stimulate further interest in the coming British Medical Association meeting next August. During the course of the evening Dr. Rennie Swan, President of the Winnipeg Medical Society, presented an Illuminated Address to Dr. Smith, while Mrs. Smith was presented with roses.

The text of the address follows:

To Dr. William Harvey Smith, M.A., M.D., C.M.

Throughout the ages, the medical profession has always delighted to honour those of its members who have rendered signal service in relieving the sufferings of humanity, or those who have given freely of their time and interest towards furthering the welfare of the community.

We, the members of the Winnipeg Medical Society, have met for the purpose of demonstrating to you, our well loved friend and brother, our appreciation of the honour which you have conferred upon this body, and on the medical fraternity, in accepting the distinguished position of President of the British Medical Association. The gifts and talents with which you have been endowed render you suitable for such an illustrious and responsible post.

You have been entrusted with the guidance and welfare not alone of the medical profession in Canada but of all those who strive to make the British Empire first in research, in scientific study, and in compassion for the afflictions of mankind. We, who know your character, your capacity for work, your enthusiasm and your interest in all that tends to the advancement of medical science, feel that the British Medical Association has honoured both you and itself in conferring this noteworthy distinction.

May we include in our felicitations your dear wife and partner. We know that the encouragement, the assistance, and the sympathy of Mrs. Harvey Smith, will help and support you in many difficulties, and enable you to put the crown of successful accomplishment on a distinguished medical career. We hereby offer you our loyal support, our unswerving affection, and our cordial salutations.

On behalf of the members of the Winnipeg Medical Society.

Signed H. D. KITCHEN, *Secretary* R. RENNIE SWAN, *President*

Dr. T. Herbert Bell, M.C., has been appointed head of the Department of Ophthalmology in the Winnipeg General Hospital.

ROSS MITCHELL

SASKATCHEWAN

Efforts to solve what is known as the "indigent patient problem" have been instituted by the medical profession of Saskatchewan. This important matter was discussed recently at the annual meeting of the Saskatchewan Medical Council. It was decided to call a conference of the organizations interested, particularly medical men, municipal officers, and the United Farmers, when it is hoped that some equitable solution will be reached.

The Saskatchewan Medical Council has elected Dr. O. E. Rothwell as *President* and Dr. A. McG. Young, M.P., as *Registrar*.

Dr. G. F. Weatherhead, of Webb, has been appointed by the government to the charge of the Health Station at Ile à la Crosse.

The hospital to be taken over by Dr. Weatherhead has a 25-bed capacity and is operated by a staff of nursing sisters of the Grey Nuns. The hospital was built by the Dominion government and is used as a health dispensing centre under the direction of the Provincial government and the Indian department. Indians and settlers from miles around are treated there.

LILLIAN A. CHASE

ALBERTA

Owing largely to the Municipal Hospital scheme, Alberta has had a considerable number of hospitals built during the past two years, so that, with the new hospitals opened by the Roman Catholic sisters during this period, a large area of the province is adequately cared for. Certain points such as Ponoka, Turner Valley and Leduc, however, are still without hospital accommodations.

Included in the Department of Health estimates for the coming session of the Legislature will be a request for a continuation of the "Travelling Clinic" which has been in operation during the past two years. The Honourable George Hoadley, Minister of Health, states that if the Legislature approves the vote he hopes to have a new feature in the addition of a specialist for ocular defects. It has been found in the course of the clinic's work throughout the province that a considerable number of the school children examined have more or less serious defects of eyesight, which in most cases could be readily remedied by proper fitting of glasses. More serious cases requiring surgical operations will be reported for treatment.

The Provincial Department of Health has arranged for psychopathic clinics in Calgary at regular intervals. Dr. C. P. Fitzpatrick, of the Mental Hospital at Oliver, will visit Calgary twice a month.

Dr. E. M. Busby, of Calgary, who has been on the staff of the Provincial Sanatorium near Calgary for several years recently accepted a position with the federal hospital at Ste. Anne de Bellevue, Que., under the Department of Pensions and Public Health.

Dr. David Christie, who has been in general practice for some months at Big Valley, has joined the staff of the mental hospital at Ponoka.

Plans for the erection of a municipal hospital at Turner Valley were discussed during the recent visit of the Hon. George Hoadley. Turner Valley is in the centre of the oil industry, southwest of Calgary, where large numbers of men are employed. There is great need for a hospital owing to the number of accidents which occur. Up to the present time the more serious cases have come to Calgary for treatment. It is expected that steps will be taken shortly for the building of an up-to-date hospital in this locality.

According to Dr. E. H. Cooke, Superintendent of the Provincial Mental Hospital at Ponoka, 30 per cent of all cases of general paresis treated in the mental hospitals in Canada at the present time are being cured, as a result of the malarial method of treatment first introduced in Canada by him at the institution with which he is connected. According to Dr. Cooke, 75 per cent of the patients who have undergone this form of treatment regain their normal health. This is a great advance on any other known treatment. Under Dr. Cooke, 114 patients have been given this therapeutic measure. Of these 43 have been discharged as "greatly improved," being in the majority of cases able to earn their own living and take a normal place in society. In only one instance has a relapse occurred. Of the other cases undergoing treatment, 25 have been much benefited, but are not completely well and are having further treatment. Three have since been deported from Canada with at least one practically recovered. One escaped from the hospital when almost cured. Thirty have died from the ordinary effects of the paralysis, or, in a few cases, from the remedial inoculations given. Twelve are now receiving first applications of the remedy. The treatment as carried out has been the inoculation of the patients with malarial plasmodia and the subsequent control of the disease by quinine.

In a recent interview between the Hon. Geo. Hoadley and Dr. H. W. McGill, M.C., representing the Council of the College of Physicians and Surgeons of Alberta, the Minister of Health stated that the Provincial Board of Health is willing to consider a scheme whereby the cost of providing necessary curative serums and vaccines would be borne by municipalities and the provincial government.

Under the present system, the total cost of such remedial measures is borne by the patient, while in the case of indigents half the cost is borne by the municipality and half by the government. At the present time the Department of Health provides free sera for prophylaxis but holds the physician responsible for those used for curative treatment. In the discussion which took place, Dr. McGill stated that it appears that a rather fine line has been drawn between curative and preventive measures. If a person is ill with diphtheria, it is a matter of public concern, and by use of curative medicines the public is protected. It seems reasonable to believe that all curative serums and vaccines should be supplied. Under the heading of "curative vaccines and serums" Dr. McGill instanced diphtheria antitoxin, scarlet fever antitoxin and serum for the treatment of epidemic cerebrospinal meningitis. Use of these biological products was absolutely imperative in many cases if the lives of the patients were to be saved. In other infectious diseases use of certain serums and vaccines was also necessary.

Dr. McGill alluded to the value of concerted action in an endeavour to stamp out disease through the use of the gifts of science, instancing the fact that some years ago in Calgary following a drive by the City Health Department and with the active co-operation of the physicians of the city, who agreed to give free inoculation of diphtheria toxoid for one year, the disease practically disappeared and the diphtheria ward at the Isolation Hospital was closed for six months. Since then there has grown up a generation of children not inoculated against the disease, and as a result, statistics show that the number of cases of diphtheria in this city is on the increase.

At the annual meeting of the United Farmers of Alberta, held in Calgary during the month of January, questions affecting the medical profession in the province were discussed. Each year this organization brings up proposals of this nature, some of which find their way to the legislature and are placed on the statutes by the Farmers' Government. The question of state medicine seemed to have been uppermost in the minds of the United Farmers this year.

The Minister of Health, the Hon. George Hoadley, was of the opinion that state medicine will be a future development in this province and made reference to the fact that 70 per cent of the medical men in Great Britain are now working for the state in one way or another, and that the Canadian Medical Association at the 1929 meeting announced its intention of investigating this question. Referring to this statement of the Hon. George Hoadley, Dr. George R. Johnson, Registrar of the College of Physicians and Surgeons of Alberta said that "until Mr. Hoadley has given a definition of what he means by state medicine and how it will be put into practice, we cannot say anything about it. I think when he speaks of state medicine and makes the statement that 'it is bound to come in Alberta,' Mr. Hoadley is referring to making medical attention possible for the poor and those living in remote areas. State medicine, in the real sense, is an entirely different thing. It means that the government would have to set up machinery to supply doctors for any persons in the province who required them. These doctors would be paid by the government. Of course we are in favour of any assistance the government can give us in helping illness and favour any equitable fair way of distributing medical aid."

The United Farmers of Alberta also passed a resolution at their recent annual meeting in Calgary, to the effect that all applicants for marriage licenses must present certificates showing that they are free from any communicable disease. This will be presented to the Government, which will in turn investigate this subject as it is being carried out in six states to the south of us, where laws governing this question are on the statute books, before attempting any change in legislation. It has been stated that no marriages are prevented or materially delayed by the statutes, since the interested parties simply go where restrictions did not exist and carry out their plans.

In an address given in Calgary during the month of January to the United Farm Women of Alberta, Dr. Fitzpatrick of the Provincial Mental Hospital at Oliver, took as his subject, "Some aspects of mental hygiene", in which he dealt with the mentally subnormal child. Children with a limited amount of brains may find great difficulty in competing with other children in school or at play and so develop an inferiority complex. If such children are separated from normal boys and given special guidance and trained along vocational lines, they will in almost every case respond to the right treatment and may become very useful members of society. Types of personality of children must be considered as well as their behaviour in studying mental cases. Knowledge of how to treat the exaggerated type while still in childhood will often salvage the near mental cases. This will mean happiness to the individual and saving much expense to the state. The establishment of institutions where a child will have the proper environment and of clinics and the appointment of trained

psychologists and other specialists to deal with subnormal children and adults would be an economical as well as a humanitarian measure. This province is gradually doing more and more work along these lines.

At a recent meeting of the College of Physicians and Surgeons of Alberta, Dr. A. E. Archer, of Lamont, was elected *President* and Dr. Harold W. McGill, M.C., of Calgary, *Vice-president*. Dr. George R. Johnson was re-appointed *Registrar* and Mr. W. G. Hunt, assistant to the Registrar.

The medical men of Camrose have demonstrated a system of co-operation, which might well be put into effect elsewhere with the same good results. Thirty-seven school districts were divided among the five physicians for purposes of vaccination against small-pox, when a thorough search was made for all unvaccinated children. The cost of this was comparatively small, as the mileage charge was nominal and the per capita fee was likewise small. It was noted that the children responded well, for generally speaking there were more present at each school than the regular attendance, and in some instances those of pre-school age as well as adults.

The question of state medicine came up for discussion with the Council of the College of Physicians and Surgeons. From information given to the Council, it appears that the Provincial Government contemplates making some amendments to the Municipal and School Districts Acts whereby townships may group themselves for Health purposes and tax themselves to provide sufficient money to pay the physician a living salary. At the present time, a municipality may tax itself to the extent of two thousand dollars but no more. Under the Amendment it will be possible for the municipalities to unite, or even sections of municipalities may unite, for the above purposes. We are advised that Saskatchewan has such provision and so far twenty districts, where formerly it was impossible to retain a physician on account of his not being able to collect sufficient money for his expenses, now have employed physicians under this scheme, who are paid sufficient to live on. This is apparently all that is contemplated in the Provincial Government's state medicine plan.

Recently a local United Farm Women's branch sent to the annual meeting, a resolution asking for an amendment to the present Chiropractic Act whereby the Examining Board will be composed of chiropractors only, for the reason that since the Act was passed in 1923 not a single chiropractor has been able to pass the required examination. The Board is now composed of two chiropractors, two physicians, and a layman, who is the chairman. When the matter came up for consideration before the United Farm Women's meeting a member of the cult was present to advocate the suggested amendment. In response to questions asked by the women, he stated that at the present time there was no educational qualification required by any of the chiropractic schools, on entering the course. The course of training was shorter than the medical, because the institutions were private ones, and, furthermore, they considered they never would have proper protection until only chiropractors examined them. The United Farm Women, not satisfied with the arguments, turned down the resolution.

At the same meeting of the Farm Women a resolution was placed on record asking the provincial Government to co-operate with the muncipalities in providing isolation hospitals throughout the province.

Some remarks of the Hon. George Hoadley on state medicine have already been alluded to. At one of the meetings of the United Farmers of Alberta, speaking on the question of health, he said that it was a mistake for anyone to talk of free medical services, for such a thing did not and could not exist. If they have services of any kind they had to be paid for by somebody. The greater the service the greater the cost, and the higher the tax necessary to support it. The government is apparently feeling the deficits of the Travelling Clinics, and is planning to amend the present legislation whereby the municipalities may tax themselves to a greater extent for the greater service they may desire.

There is a growing feeling in Alberta that the present amendment to the Mental Hospital Act whereby drug addicts may be committed to a mental hospital for custodial care and treatment is not entirely successful. The public has a natural aversion to having members of their families sent to a mental hospital, for in their opinion it creates a reflection on the patient's family. In addition, mental hospitals are not equipped as a rule with wards or sufficient guards for the proper care of these unfortunates. Violation of the Dominion Narcotic Act and the care of those who violate it should be the responsibility of the Federal Government. If this were undertaken by them, one institution would meet the requirements of western Canada. There should also be one for central Canada and one for eastern Canada.

G. E. LEARMONTH

UNITED STATES

University of Pennsylvania School of Medicine

The School of Medicine of the University of Pennsylvania, under the direction of Dr. Alfred Stengel, has introduced a method of connecting the fundamental sciences with the clinical work of the fourth year. One hour a week is devoted to the presentation of certain problems, as represented by certain cases at the University Hospital, and the discussion of them by the professors of physiology, physiological chemistry, pharmacology, anatomy, and pathology.

Mental Hygiene

A preliminary announcement of the first International Congress on Mental Hygiene has just been made. The congress is under the patronage of President Hoover and will be held in Washington, in connection with the annual meetings of the American Psychiatric Association and the American Association of the Study of the Feebleminded, from May 5th to 10th, inclusive. It is hoped to compare international experience in mental hygiene work and to promote international co-operation in the movement. Another object of the conference will be to correlate the activities of such various workers as the psychiatrist, the psychologist, the psychiatric social worker, occupational therapist, public administrator, educator, and sociologist. Mental hygiene objectives will be considered both in the body of the congress and by special committees appointed to sit between sessions. It is planned to reduce formal papers to a minimum in order to have plenty of time for discussion. Reduced steamship rates are available on the boats of all companies that belong to the Trans-Atlantic Passenger Conference. Further particulars are available from Mr. John R. Shillady, at 370 Seventh Avenue, New York City.

More than six hundred leaders of the mental hygiene movement gathered recently in New York to celebrate the twentieth anniversary of the movement in this country. Dr. W. H. Welch recorded the gathering of 14 persons on May 6, 1908, at the home of Anson Phelps Stokes, in New Haven, to found the Connecticut Society of Mental Hygiene, and contrasted that gathering with the great scope and importance of the movement to-day. Dr. Angell spoke of the mental hygiene work which has been done under the direction of Dr. Arthur H. Ruggles in Yale University. Among the numerous messages of congratulation received was one from Sir Maurice Craig, the Chairman of the National Council for Mental Hygiene of Great Britain.

New York Polyclinic Medical School and Hospital

The following have been appointed to the Faculty of the New York Polyclinic Medical School and Hospital:

Shirley W. Wynne, M.D., (Health Commissioner, New York City), Professor of Preventive Medicine.

Gaylord W. Graves, M.D., Professor of Pædiatrics.

Alexander T. Martin, M.D., Professor of Pædiatrics.

A New Hebrew Medical Journal

We desire to call attention to a new medical journal which has recently made its appearance and of which we have received the second issue. It is *The Hebrew Physician*, (Harofeh Hoibri), the only Hebrew medical journal published outside of Palestine.

This journal is under the editorship of Dr. Moses Einhorn and Dr. L. M. Herbert. It consists of 180 pages, and contains numerous articles on general medical subjects, including a copy of the manuscript on "Hæmorrhoids", by Shlomo Eben Ayub of Badrash, France, (1265 A.D.). A special section is also devoted to new Hebrew medical terminology.

All physicians who are interested in this journal, are requested to communicate with *The Hebrew Physician*, 983 Park Avenue, New York City.

GENERAL

Vital Statistics of Canada

The Dominion Bureau of Statistics has published a preliminary report on the vital statistics of Canada for the year 1928, from which the following facts are taken in respect of a population estimated as 9,645,000. The birth rate is one-tenth of 1 per cent less than that for 1927, being 24.5 per 1,000; 3.1 per cent of these births were illegitimate. The general mortality rate was 11.3 per 1,000, which is slightly higher than the corresponding rate in 1927, but is rather lower than that for 1926. While comparisons between the various provinces in this respect can only be legitimately made with some reservations, it is noteworthy that Quebec has the highest rate (13.8), while Saskatchewan has the lowest (7.2). There is little doubt that one disease which contributes largely to this higher mortality of Quebec is tuberculosis. This province had a record of 2,686 deaths from tuberculosis, out of a total for the Dominion of 6,481. Diseases of the heart accounted for the highest number of deaths—namely, 12,640; diseases of the arteries caused 5,644, and nephritis 5,717 deaths. Among children it is notable that there has been a considerable reduction in the mortality under the age of 5; but, even so, there is room for much more improvement, since the figures show that practically 20 per cent of all deaths were those of infants under 1 year old, and that 25 per cent of all deaths were those of children under 5 years of age. Maternal mortality showed no change in the rate which obtained in the previous year—namely, 5.6 per 1,000 living births. This rate was highest in Prince Edward Island and Alberta (6.1 and 6.8 respectively), and much remains to be done to bring about improvement in this respect. There are other diseases, however, which have been clearly shown to be more easily controllable, and yet they still appear statistically in unwelcome numbers; typhoid fever, for example, caused 468 deaths, and diphtheria 913.

An Amazing Traffic

The annual reports from the several governments to the League Advisory Committee, sitting at Geneva, illustrate the obstacles to a just estimate of the opium traffic and drug consumption. When more Indian opium was shown to have been seized by the Chinese Customs than the whole of India produces, it was agreed that there had been errors in calculation. A recent article in the *Weekly Times*, based on the work of the Central Narcotics Intelligence Bureau, an Egyptian institution, demonstrates how European governments are apt to make mistakes in another direction. Cairo, as the correspondent says, is a strategic point on the main traffic routes for opium and other drugs. The traffic is so vast, and carried on by means so subtle and ingenious, as almost to excuse its excessive use by writers of detective stories with a craving for the fabulous. According to the reports presented to the Advisory Committee, the drug addicts in the United States do not exceed 100,000, while in one Chinese province there are 1,000,000 in a population of 10,000,000.

The Second Canadian Conference on Social Work

The Second All-Canadian Conference on Social Work will be held in the Royal York Hotel, Toronto, April 28th to May 1st.

Nearly one hundred million dollars is spent annually in the Dominion by public and private social agencies, it is estimated. Personal maladjustment of the individual to the community and failure of the community in its duty towards the individual are the causes of this stupendous expenditure.

Fully a thousand social workers from all parts of Canada are expected to come together in these four days, for the better understanding of social maladjustment and the sharing of knowledge of methods of prevention and rehabilitation.

Some of the subjects to be discussed are: Health; Child and Family Welfare; Immigration; Social Statistics; Social Work Publicity and Finance; Community Organization; Delinquency Courts and Probation; Community Centres and Recreation; Industrial and Economic Problems; Recruiting and Training of Social Workers. Dr. W. E. Blatz, of the University of Toronto, will conduct a special study group on "Behaviour Problems in Parent-Education." Another study group will consider "Problems of Family Case-work."

Open meetings will be held on the first three evenings, and the conference will conclude with a banquet to be addressed by Mr. E. W. Beatty, President of the Canadian Pacific Railway, and Hon. G. Howard Ferguson, Premier of Ontario.

A New Faculty of Medicine at Marseilles

Marseilles is the second largest town in France, with a population of about a million. Up to now it has had only a "school" of medicine; that is, students could only take part of their course there and had to

go for nearly all their examinations to another town. Generally they went to Lyons or Montpellier, where there are faculties of medicine, though Montpellier has hardly 100,000 inhabitants. Jealousy between the neighbouring towns has hitherto prevented the development of the medical school of Marseilles, but since at such a big port an extraordinary variety of diseases may be observed it is satisfactory to learn that university status has now been achieved. The faculty at Marseilles will develop the department of tropical medicine and pathology, and it is hoped that in the course of a few years it will become an important centre for teaching and research.

The Netherlands Cancer Institute

The new Netherlands Cancer Institute was recently opened at Amsterdam under very auspicious circumstances by Her Majesty Queen Wilhelmina.

The Queen Mother addressed the assembled delegates, received the directors and professional staff of the Institute, inspected the new building, and manifested a keen interest in the occasion.

Prof. W. M. de Vries, President of the Institute, made the address of welcome and discussed the significance of cancer institutes in general. In the absence of Prof. J. Rotgans, Honorary President of the Institute, due to illness, his prepared address was read by Prof. J. J. Van Loghem, one of the directors. The Minister of Labour addressed the assembly; and Dr. N. M. Josephus Jitta, President of the State Board of Health, read a paper entitled "The work of the League of Nations in relation to cancer."

During the sessions, which extended over a period of five days, lay audiences were addressed by Dr. R. de Josselin de Jong, professor of pathology in Utrecht, who read a paper on "Ideas of modern cancer research"; and by Dr. W. F. Wassink, director of the Institute's clinic, who talked on "What everybody should know about cancer."

At the meetings for the medical profession, members of the staff of the Institute read scientific papers on various aspects of the cancer problem. At a session for pathologists, specimens belonging to the Institute were demonstrated and discussed.

An exhibition for the general public included cancer educational material, pathological specimens, and technical apparatus. Literature and posters of the American Society for the Control of Cancer were displayed at this exhibit and the Society's film for the laity, "This Great Peril," was shown several times. The exhibition was visited by more than four thousand people.

The Netherlands Cancer Institute was founded in 1913, largely as a result of the interest and efforts of Mr. J. H. de Busey, editor in Amsterdam. The original hospital and laboratory was opened in 1915 and served the purposes of the Institute until the completion and opening of the new building. The new building is called "Antoni Van Leeuwenhoek-Huis," in honour of the eminent Dutch microscopist. It provides increased hospital and laboratory facilities for cancer research and treatment, including a special department for x-ray and radium.

China Raises Medical Standards

The passing of the old-style uneducated Chinese physicians becomes imminent as a result of a resolution passed by the National Board of Health at its conference in Nanking in June. *Science Service* reports that the Board decided not to grant new licences to unscientific practitioners after December 31, 1930.

Considerable agitation resulted among the two thousand or so "old-style" doctors in Shanghai. A meeting of protest was held and a strike of medicine-shop employees took place. Posters appeared on the shutters of medicine shops pointing out the need of the old-style physicians and medicines, and the harm that would accrue to the nation if they were abolished. On the other hand, advanced opinion, while admitting the hardship worked on the old-style physicians, takes the stand that such an important step as refusing them new licenses should not be delayed for almost two years. It is pointed out that the ignorant classes in China will long continue to go to native old-style physicians, regardless of whether they are licensed to practice or not, so that the sooner definite steps are taken to fight this evil the better.

The old Chinese physicians are little more than quacks, and cause incalculable harm, both directly by their treatments and indirectly by keeping patients from seeing scientific physicians until too late to save the patients' lives.

Italian Inter-University Institute

The Institute of Medical Education at Varese, Italy, announces a second summer course to be held from July 10th to 31st, 1930.

The subjects dealt with are chiefly in connection with pathological physiology, and clinics on circulatory and renal disturbances will be held. The following teachers will take part: Professors Gentile, Livini, Foà, Rondini, Carpi, Pepere, Pezzi, Cesa-Bianchi, Cattaneo, and Zoia.

Special lectures will be given by Prof. B. Rossi, on the surgery of the kidney; Prof. M. Donati on the surgery of vessels; Professor Alfieri on cardio-renal disturbances in pregnancy; Professor Cazzaniga on medico-legal problems regarding cardiorenal pathology; Professor Pisenti on economical and social viewpoints in cardio-renal pathology.

The following trips are announced: To Lago Maggiore—2nd Sunday of July, 8 a.m. to 3 p.m.; to Lago di Como—3rd Sunday of July, 8 a.m. to 3 p.m.; to Certosa di Pavia—4th Sunday of July, 8 a.m. to 3 p.m.

Medical men attending the course and members of their families will find full board at very reasonable prices according to the following rates: Hotel A, lire 50 a day; hotel B, lire 40 a day; hotel C, lire 30 to 35 a day.

These prices are inclusive of room, food (with wine), service, sojourn-tax.

The Italian State-railways will grant a reduction of fares on the lines from the Italian frontier to Varese and back.

The Nord-Milano-Railways will reduce the prices of season-tickets by 50 per cent during the time of the course. The same will be done by the tramways and cable railways of Varese.

For inscription and all information apply to "Compagnia italiana Turismo" (Piazza Colonna, Roma) or offices and agencies of this Society in Italy and abroad or to the "Instituto di cultura medica" Varese (Rossini, Corso Roma 4).

Book Reviews

A Textbook of Biochemistry. A. T. Cameron, M.A., D.Sc., (Edin.), F.I.C., F.R.S.C. Second edition, 482 pages, 14 illustrations. Price 15s. J. & A. Churchill, London, 1929.

A Course in Practical Biochemistry for Students of Medicine. A. T. Cameron, M.A., D.Sc. (Edin.), F.I.C., F.R.S.C., and Frank D. White, A.R.T.C., Ph.D. (Edin.), F.I.C. 222 pages, 4 plates, 23 text figures. Price: 8/6d. J. & A. Churchill, London, McAinsh & Co., Toronto, 1930.

The facts about biochemistry, as they are known at the present time, may be found widely scattered in the literature. However, though much of fundamental importance may be found in various journals there are available a number of text or reference books for students of pure biochemistry. In addition to these students, there is a relatively large group who, though less well trained in the subject, must nevertheless make use of much of the information they may impart. Medical students belong to this group and for them such books, though they may serve their purpose otherwise, have their limitations; they generally presuppose a good knowledge of fundamental and allied subjects which the medical student does not, and, because of the time factor, cannot possibly, acquire during his course. In order to present the subject in a well ordered, thorough, and logical manner, simple facts of practical importance to the medical student are masked by a mass of relatively less important data. There is, also, the fact that the subject of biochemistry is continually developing; with the accumulation of experience, technical and otherwise, the interpretation of data changes. Consequently, a large amount of controversial matter is included in such books.

For medical students, an ideal presentation of the subject would be one in which the known and more important facts are simply, clearly, and systematically outlined, and in which controversial matter is reduced to a minimum. In such a presentation, one would, of necessity, at times, have to be dogmatic, but dogmatism has its legitimate place in good teaching. Combined with a correspondingly simple, but comprehensive, practical course, the student should find this good groundwork. The authors of the above two books have been successful in an attempt to produce such a work.

On the theoretical side, Professor Cameron outlines the main facts of biochemistry in a small clearly written volume. Though at times dogmatic, there is a sufficient amount of controversial matter to stimulate the imagination of the mind that can be stimulated. Differing from most works of a similar nature, this book has the advantage of being based upon the experience of a course of lectures given to medical students for a number of years. During this period, the author has had the opportunity of testing his methods, using what is, perhaps, the best available guide, the students' response.

While reading this book, it is assumed that the student is simultaneously taking a course in practical work. Professor Cameron and his collaborator, Professor White, have for this purpose outlined a practical course and, again, the teacher is seen. Fundamentals are dealt with very clearly and clinical applications of the different tests taught are frequently referred to. For work which is now a routine in clinical medicine, the authors have selected one method for each blood and urinary constitutent from the many of those available. All those selected have stood the test of time and experience. Though one might not entirely agree with this selection, as technical experiences differ with different workers, the intent is obvious and, again, the hand of the practical teacher is seen. It is obviously the purpose of the authors to have the student master the technique of one method thoroughly, rather than to confront him with a number of tests each of which is based upon different principles and from which, because of the limited time and training, he cannot intelligently select.

It is very pleasing to note that the authors discourage micro-methods which involve the use of a few drops of blood. While in skilled hands, with apparatus of great precision, such methods may lead to accurate results, with the average individual, the probability is that the results will be anything but accurate, and, as the authors aptly point out, it is just as simple, and no more painful to the patient, to obtain a few cubic centimetres of blood from a vein as a few drops of blood by pricking a finger or an ear.

On the whole, therefore, in the above two works, there is a well ordered presentation of the subject of biochemistry as it is known to-day, and when both books are made use of simultaneously, when theory is combined with practice, they should form an excellent ground-work for the medical student.

I. M. RABINOWITCH

Physical Signs in Clinical Surgery. Hamilton Bailey, F.R.C.S. (Eng.). John Wright and Sons Ltd., Bristol, 1930, 21/- net.

The second edition of this work, which was first published in 1927, comes with over 300 illustrations, some of which are in colour. There are 24 chapters and an appendix, all comprised in an ideal sized volume of 256 pages. Its unusually sombre binding is counterbalanced by the unusually fine paper on which the illustrations and photographs stand out clearly; none of them are blurred. To mention one in particular, the coloured photograph of a case of traumatic asphyxia is a clinic in itself; and the picture of transillumination of a cyst of the female breast by a Cameron lamp has to be seen to demonstrate the value of this means of diagnosis.

The original work was based on the author's methods of teaching fourth year medical students, and the reviewer had the book in use in a theatre clinic within two hours of first seeing it. It is heartily recommended, as it gives shortly and clearly methods of examination, signs and symptoms, and photographs showing these latter so that the student is not confused by too much detail. Even experienced clinical teachers will find many valuable points for teaching methods of examination, and the student and practitioner will pick up the book and find something useful and often diagnostic for any case under review. For example, in the diagnosis between a cyst and a solid tumour of small size we find the application of Paget's test " a solid tumour is most hard in its centre, whereas a cyst is least hard in its centre." So too is found A. J. Walton's paradoxical statement differentiating thyroid adenomata from cysts, "The solid adenomata feel cystic, and the cystic adenomata feel solid." The illustration of the inverted embryo in front of the outlined fissure of Rolando on the scalp gives a ready and graphic way to remember the cerebral topography of this area.

The whole volume is entirely on physical examination and the determination of clinical signs, and the

reader will find no padding and no dissertations on disease or pathology. The work will be welcomed especially by the student in the two final years, puzzled as he often is by the cases he is reporting, and the varying teaching he receives. The book can be taken into the ward and used at the bedside while writing his case report. Every library of a medical school should have a copy available for the students, and the hospital interne would be well advised to have a copy too. For the named clinical signs (which are fast becoming too numerous) many apt photographs are shown and briefly explained; many signs do not require more than the self-explanatory illustration. Mr. Bailey's work is well worth the English price, twenty-one shillings.

CHAS. K. P. HENRY

A Textbook of Medicine. By Various Authors. Edited by J. J. Conybeare, M.C., M.D., F.R.C.P. 976 pages, 24 illustrations. Price $7.00. Livingstone, Edinburgh; Macmillan Co. of Canada, Toronto, 1928.

The subject matter of this book is excellent, well aranged, and easy to read, dealing in an up-to-date way with all phases of medicine. The sections on the ductless glands and metabolism are particularly good. The whole work is not too exhaustive, but is a comprehensive survey of modern medicine and a very useful addition to our medical libraries.

The book is well indexed, but possibly it could have been improved by the addition of more illustrations.

H. D. KITCHEN

Modern Methods of Feeding in Infancy and Childhood. Donald Paterson, B.A., M.D., F.R.C.P. London, Physician for Disease of Children, Westminster Hospital, and J. Forrest Smith, M.R.C.P. London, Physician to Out Patients, St. Thomas' Hospital. Second Edition, London, Constable & Co.

After a brief period of little more than two years a second edition of this clearly written volume on the feeding of infants and children has been called for. The quantity and the character of food to be given to an infant not infrequently prove to the general practitioner a difficult task. The authors in this monograph discuss the various problems which may arise and present a series of easily followed rules for the feeding of the rapidly growing infant, but emphasize the fact that the food requirements of one may vary considerably from that of another. The only test we can apply is a steady and sufficient weekly gain in weight of the infant, its development and general well-being.

In this second edition the authors have added a chapter on diets for sick children, and children of school age, and a description of the common articles of diet, with their uses and digestibility. The sections on vitamins, on condensed milk, and on the preparation of lactic acid feeds have been re-written and brought up to date. On one small point only would we question the statements made. In discussing the fruit juices we hesitate to place grapes and grape juice on an equality with orange juice for the supply of vitamin C. This small volume is strongly recommended to physicians and nurses in need of good advice on an important subject which not infrequently appears beset with difficulties.

A. D. BLACKADER

Blood Picture and Its Clinical Significance. Victor Schilling. Translated and edited by R. B. H. Gradwohl, M.D. Seventh and eighth (revised edition. 408 pages, 48 illustrations. Price $10.00. C. V. Mosby Co., St. Louis; McAinsh & Co., Toronto, 1929.

This book is unique in the experience of the reviewer. As stated in the preface, it is not a text-book of hæmatology, but a guide book on the microscopy of the blood. It is a summary of the practical experiences of Professor Schilling and is intended to supplement rather than to replace existing laboratory manuals. According to the author, the frequent routine microscopic examination of the blood is as essential a bedside procedure as taking the pulse and temperature and making analysis of urine. Daily (even more frequent) differential counts are indicated in many diseases in which they are not generally considered to be of value. This multiplicity of examinations has resulted in the development by the author of special forms and graphs.

The book is divided into four sections. Part I—Technique; Part II—Theory, Morphology and Division of the Blood Picture; Part III—Fundamental Principles for the clinical use of the Blood Picture; Part IV—Selected Examples of the Practical use of Hæmograms. In each of these subdivisions the subject is dealt with in great and complete detail. In the division of technique, the procedures are indicated with great clearness. In the second and third parts embryological and post-natal hæmatopoiesis, various factors influencing blood changes, and the microscopic pictures of the blood in all known diseases of the hæmatopoietic system are dealt with in scrupulous detail. Blood changes in conditions not generally supposed to have determinable alterations in the blood are noted and thoroughly discussed. New terms, or rather terms which are perhaps not familiar to the majority of physicians on this continent, are freely used and may be a little confusing until the reader familiarizes himself with them. Leucocytic "shifts" are emphasized. Although the differential leucocyte count as now in general use is not considered of great value except in a few specific conditions, an attempt is made to show that the author's methods, especially the use of the Schilling "hæmogram", prove these counts to be very valuable in diseases where they are not usually made, or made in a very perfunctory way. The value of two blood examinations little used here is stressed. These are the thick drop method and the "guttadiaphot." The latter procedure is the examination by transmitted light of drops of blood absorbed by special red, green and blue coloured papers: pathological changes being indicated by a corona or halo which develops around the drops during the drying process. To be thoroughly appreciated this book requires a great deal of careful application.

JOHN JAMES OWER

A Manual of Proctology. T. Chittenden Hill, M.D. Third Edition. 272 pages, illustrated, 86 engravings. Lea & Febiger, Philadelphia, 1929.

The second edition of this book was reviewed in these columns in January, 1917. It was then stated that the manual formed a very compact and clear exposition of the practical essentials of the subject. The third edition, now under review, contains no changes from the contents of its predecessor except that instead of Dr. Coffey, Dr. E. Parker Hayden has written the section dealing with cancer of the rectum. The book remains an excellent guide to the diagnosis and treatment of diseases of the rectum and anus. It is concise, free from irrelevant matter, clearly written and practical.

The reading matter covers only 269 pages and contains on every page information that is reliable and useful.

W. E. M. MITCHELL

The Mobilization of Ankylosed Joints by Arthroplasty. W. Russell MacAusland, M.D., and Andrew R. MacAusland, M.D. 252 pages, 154 illustrations. Price $4.00 net. Lea & Febiger, Philadelphia, 1929.

This authoritative contribution to our knowledge of the surgery of ankylosed joints, by the McAuslands of the Carney Hospital, Boston, Mass., demonstrates what can be accomplished by painstaking surgical care

and the use of good judgment in handling this difficult class of cases. The authors have had an extensive experience in this branch of orthopædic surgery, and the technique which they have adopted, should serve as a standard for those who have such operations to perform.

The volume is divided into four parts, the first dealing with the types of ankylosis, etiology, pathology, diagnosis and the early and modern methods of treatment, as well as the importance of the functional position in the treatment of joints. The second part is devoted to a consideration of arthroplasty and various operative measures used, with the indications and contro-indications and results of this operation. Part three discusses arthroplasty of specific joints. Part four is concerned with the prevention or minimization of ankylosis and the relation of the restoration of motion to the treatment of joints in functional position, the treatment of traumatic lesions and of acute sepsis of joints and the present day treatment. The treatment of chronic arthritis is also included. At the end of each part and in some instances at the end of the section, a summary of the literature has been appended.

Discussion centres around the intra-articular type of ankylosis with fibrous or bony union of the joint structures with consequent dysfunction, and in many cases added deformity. To restore such a joint to functional activity is a great desideratum, but to have stability as well gives almost all that can be hoped for. Truly a great advance has been made since the early and middle parts of the past century when "brisement forcé" was generally practised.

The pioneer work of the late John B. Murphy is referred to. Murphy devised the method of utilizing a pedicled flap and fatty tissue taken from parts adjacent to the involved joint. He believed that fat was a necessary adjunct. Time has proved that the inclusion of fat is not necessary, neither is the pedicled flap. At the present time, free fascial flaps alone are used. These are obtained from the fascia lata of the thigh.

This volume is well illustrated, the type is good and is to be commended for the exactness of detail and thoroughness with which the authors have handled an intricate subject. To the orthopædic surgeon especially it will be of value, embracing as it does the handling of a difficult class of cases.

G. E. LEARMONTH

Practical Local Anesthesia, and its Surgical Technic. Robert Emmett Farr, M.D., F.A.C.S. 2nd edition. 611 pages, 284 illustrations. Price $9.00. Lea & Febiger, Philadelphia, 1929.

The first edition of this meritorious work appeared in 1923 and the author has taken the opportunity, in this second edition, of deleting what has since become obsolete and of thoroughly revising and bringing up to date the text throughout. While local anæsthesia is not likely to replace general anæsthesia in many operations of great magnitude, yet its possibilities have been greatly enlarged and enhanced by the pioneer work and continued research of such men as Farr of Minneapolis. The scope of local anæsthesia is far reaching, and operations which a few years ago would not be undertaken by the average surgeon with local anæsthesia are now being performed with comparative ease and comfort to the patient.

This volume deals not only with the use of local anæsthesia, but with surgical technique as well and is noteworthy because of the painstaking descriptions which are given of operations on the head (including the brain) and face, breast, thorax and spine, the extremities, the male and female genitalia, rectum and anus, the abdomen and abdominal wall, the intestines, the appendix vermiformis and the pelvis.

The author deals adequately with the various drugs used in producing local anæsthesia, and the particular value of each, inclining to the use of novocain for the great majority of operations. His advice in the special use of certain drugs which fall short of the mark is pertinent. Spinal anæsthesia is referred to but not considered at any length. Case records are included in the descriptions of the technique employed in many of the operations. Whether these additional facts add to or detract from the value of the work is an open question. To the reviewer this method of elucidating the text adds materially to its value. The author's large experience in this branch of the anæsthetic art lends weight to this opinion since many points are made clearer by this application of clinical enlightenment. In the earlier part of the text there is considerable repetition of expressed opinions but this serves in great measure to emphasize and impress certain fundamental facts. Less space might have been devoted to illustrations of surgical instruments, some of which have been improved upon since the cuts were made. Exception might be taken to the use of adrenalin chloride solution with novocain in operating for toxic goitre. The use of adrenalin has been entirely abandoned in many of the larger clinics owing to the danger of a fatal issue. However, the author speaks advisedly of its employment in this connection.

The work is almost encyclopædic in nature, yet the chapters are well balanced, and, from the surgical as well as the anæsthetic view point, evidence sound judgment.

There have been few contributions published which have included within their covers such a wealth of detail pertaining to this branch of the anæsthetic art as does this one. This volume can be thoroughly recommended as being one of the very best of its kind, and should be in the hands of every surgeon.

G. E. LEARMONTH

BOOKS RECEIVED

Annals of the Pickett-Thomson Research Laboratory. 392 pages, plates. Vol. V. London: Baillière, Tindall & Cox; Baltimore: Williams & Wilkins, 1929.

The Cancer Process. J. J. M. Shaw, M.A., M.D., F.R.C.S.E. Price 1/- net. E. & S. Livingstone, Edinburgh, 1930.

Diet and Efficiency. Harold H. G. Holck. 72 pages, charts. Price $1.10. Macmillan Co. of Canada, Toronto, 1929.

Research and Medical Progress and other Addresses. J. Shelton Horsley, M.D., Attending Surgeon, St. Elizabeth's Hospital, Richmond, Va. 208 pages, plates. Price $2.00. St. Louis: C. V. Mosby Co.; Toronto: McAinsh & Co., 1929.

Chemistry for Nurses. Irene Koechig, A.M. 304 pages. Price $2.75 net. Lea & Febiger, Philadelphia, 1929.

The Dietary of Health and Disease. Gertrude I. Thomas, Instructor in Dietetics, University of Minnesota. 276 pages, illustrated. Second Edition, thoroughly revised. Cloth $2.50 net. Lea & Febiger, Philadelphia, 1930.

The Medical Clinics of North America. Philadelphia Number. Vol. 13, No. 4. 300 pages, illustrated. Price, cloth $18.00; paper $13.50 per year (6 numbers). London and Philadelphia: W. B. Saunders Co., Toronto: McAinsh & Co. Ltd., 1930.

General Surgery. The Practical Medicine Series. Evarts A. Graham, A.B., M.D. 800 pages, illustrated. Price, $3.00. The Year Book Publishers, Chicago, 1929.

The Harvey Lectures. Delivered under the auspices of the Harvey Society of New York, 1928-1929. Series XXIV. Drs. Aub, Brown, etc. 216 pages, charts. The Williams & Wilkins Co., Baltimore, 1930.

Transactions of the American Association of Genito-Urinary Surgeons. Forty-first annual meeting held at Manchester, Vermont, June, 1929. Vol. XXII. 454 pages, illustrated. The Bruce Publishing Co., St. Paul and Minneapolis, 1929.

The Practical Medicine Series. Series 1929. Weaver, Brown, etc. 829 pages, illustrated. Price $3.00. Year Book Publishers, Chicago, 1929.

Laboratory Methods. Charles F. Craig, M.D. 696 pages, illustrated. Price $2.75 net. Lea & Febiger, Philadelphia, 1929.

Outlines of Internal Medicine. Clifford Bailey Farr, M.D., Fifth Revised Edition, illustrated, with engravings and plates. 386 pages. Lea & Febiger, Philadelphia, 1929.

The Surgical Clinics of North America. Vol. 9, Nos 3, 4, 5, 6. 300 pages, illustrated. Cloth $18.00; Paper $13.50 for set of six. London and Philadelphia, W. B. Saunders Co., Toronto: McAinsh & Co., 1929.

The Radium Treatment of Cancer of the Uterus. Cancer Research Committee. 37 pages, 2 plates and illustrations. Price 2/6 net, paper covers. London, W.C.1, H. K. Lewis Co., 1929.

Essentials of Chemistry. Gretchen O. Luros, B.S. 269 pages. Price $3.00. Montreal, J. B. Lippincott Co., 1929.

Testicular Grafting From Ape to Man. Theodore C. Merrill, M.D. 125 pages, illustrated. London W.C.1., Brentano's Ltd., 1927.

Nurses' Handbook of Obstetrics. Louise Zabriskie, R.N. 464 pages, 250 illustrations. Price $3.50. Montreal, J. B. Lippincott Co., 1929.

Synopsis of the Practice of Preventive Medicine. Warren, S. 194 pages. Cambridge, Harvard University Press, 1929.

La Tuberculose Pulmonaire. Dr. Jacques Stephani de Montana. 312 pages, 26 figures. Paris, Payot, 1929.

Medical Diseases of Children. D. N. Nicholson, M.B., M.R.C.P. (Edin.) 74 pages. Edinburgh, E. & S. Livingstone, 1929.

Psychology. John H. Ewen, M.R.C.S. (Eng.) 72 pages. Price 1/6. Edinburgh, E. & S. Livingstone, 1929.

Medical and D.P.H. Examination Papers. 186 pages. Edinburgh, E. & S. Livingstone, 1929.

What Everyone Ought to Know. Oliver T. Osborne, M.D. 313 pages. Price $2.50. Charles C. Thomas, Publisher, Baltimore, 1929.

Catalogue of Lewis's Medical and Scientific Circulating Library. Parts I and II. 576 pages. Price 15/- net. H. K. Lewis and Co., London, W.C.1, 1929.

Medical Clinics of North America. Vol. xiii, Nos. 1 and 3, July, 1929. No. 4, Jan., 1930. Price $13.50 for set of six. London & Philadelphia, Saunders Co., Toronto, McAinsh & Co.

Collected Papers of the Mayo Clinic and Mayo Foundation. Vol. xx (1928 papers). Edited by M. H. Mellish. 1197 pages, illustrated. Price $13.00. London & Philadelphia, Saunders Co. Toronto, McAinsh & Co., 1929

The Treatment of Varicose Veins by Intravenous Injections. J. D. P. McLatchie, M.D., C.M. (Ed.) 51 pages. Price $1.75. The Macmillan Co. of Canada, Toronto, 1929.

Landmarks and Surface Markings. L. Bathe Rawling, M.B., B.C. (Cant.) F.R.C.S. 98 pages, 36 illustrations. Price 7/6 net. H. K. Lewis & Co., London, 1929.

BLOOD CHANGES IN THE VICTIMS OF THE CLEVELAND CLINIC DISASTER.—In view of the editorial comment on the hazard of toxic gases formed in the combustion of roentgen films, the blood changes observed in several victims of the Cleveland Clinic disaster who were alive on the second day were studied by Edward Muntwyler, George H. Ray, Victor C. Myers and Torald Sollmann. The patients gassed in the Cleveland Clinic disaster can be divided into two groups: those who died almost immediately, and those in whom the symptoms were delayed for several hours. No specimens of blood were obtained from the former, who succumbed probably to the additive effects of carbon monoxide, nitric fumes and possibly cyanide gases. The second group of clinic patients became practically free from any symptoms on going into the open air after being gassed, only to succumb from six to eight hours later to a sudden attack of dyspnea and cyanosis. The majority of the patients died in from six to forty-eight hours, but a number died of pneumonia days or weeks later. Very few of those who had any notable degree of œdema recovered. At autopsy the lungs showed a tremendous œdema, which no doubt was a paramount factor in the blood changes observed. The specimens of blood which the authors report were drawn from the arm vein on the second and third days after the poisoning. The venous blood had assumed a sticky, concentrated consistency which made the drawing of the sample more or less difficult. The complete explanation of the polycythæmia is not entirely clear, although it would appear to be a direct or indirect consequence of the pulmonary œdema. The oxygen capacity and total pigment values agreed. Spectrophotometric observations, made with a Keuffel and Esser colour analyzer, confirmed the observations made by the Stadie method, if the readings were made promptly after the blood had been laked. In every case the data were those of oxyhæmoglobin. Within a few minutes after laking, however, methæmoglobin began to appear. This gave a normal hæmoglobin reading directly after laking; ten minutes later the data indicated 12.2 per cent methæmoglobin, and in twenty minutes the concentration of methæmoglobin had reached 50.4 per cent. This change was noted to a varying degree in the other samples of blood examined. The final reading, thirty minutes after laking, showed that 83 per cent of the hæmoglobin had been changed to methæmoglobin. There is a marked unsaturation of the venous blood. Undoubtedly the œdema and lung tissue destruction played an important part, and an indeterminate amount was probably due to the slowing of the circulation through depression of the heart and vessels by the prolonged deficient oxygen supply, and perhaps through toxic shock from the absorption of protein cleavage products from the corroded lungs. In three of four specimens of blood in which the plasma chloride was determined, this showed a definite lowering similar to that in ordinary pneumonia.—*J. Am. M. Ass.* 93: 512, Aug. 17, 1929.